



U.S. Fish & Wildlife Service

# Public Use Summary

## *Arctic National Wildlife Refuge*



April 2010





## Report Highlights:

This report contains a summary of historic visitor use information compiled for the area now designated within the Arctic National Wildlife Refuge boundary (up to 1997); depicts a general index of recent visitor use patterns (1998-2009) based upon available data; summarizes available harvest data for general hunting and trapping; and discusses current trends in public use with implications for future management practices.

### Recent visitor use patterns include:

- Visitation has generally remained steady since the late 1980s, averaging around 1000 visitors, yet at the same time there has been a steady increase in the number of commercial permits issued.
- The Dalton Highway serves as a significant access corridor to the Refuge. The highway passes less than a mile from Atigun Gorge, which has experienced a steady increase in visitation.
- The majority of visitors float rivers, while hiking/backpacking and hunting comprise other major user activities.
- Across activity types, more than half of the commercially-supported visitation is guided.
- On average, where locations are known, about 77% of overall commercially-supported visitation occurs north of the Brooks Range, while about 23% occurs on the south side.
- Nearly one-quarter (21%) of the commercially-supported visitors to the Refuge visit the Kongakut River drainage on the north side of the Brooks Range.
- Commercially guided or transported recreational visitors spend, on average, about nine days in the Refuge, in groups that average around five individuals.
- On average, it appears that hunters make up 28%, and recreational visitors make 72% of the total number of commercially-supported visitors.
- Most general hunters use an air taxi or a transporter to access the Refuge, yet an unknown number of general hunters use their personal airplanes.
- Several of Arctic Refuge's hunting guide permittees have permits for two guide use areas, resulting in a total of 11 hunting guide service providers on the Refuge.
- Guided hunters made up about 25% of the total number of commercially-supported general hunters, while unguided hunters using commercial air operators made up about 75%.

- Many of the hunters on Arctic Refuge hunt various species during the same hunt. It is common for a hunter to have sheep, caribou and grizzly tags for a north side hunt or moose, caribou and grizzly tags for a south side hunt.
- According to the recent Arctic Refuge Visitor Study Summary, the greatest positive influence on visits came from experiencing the components of 'Wilderness' (92%), 'A Sense of Vastness' (92%), 'Remoteness and Isolation' (89%), 'A Sense of Adventure' (84%), and 'Natural Conditions' (84%).
- According to the recent Arctic Refuge Visitor Study Summary, the Refuge purposes most frequently rated as "Very Important" were 'Wildlife' (97%), 'Wilderness' (96%), 'A bequest to future generations' (89%), 'Remoteness and isolation' (89%), and 'A place where natural processes continue' (86%).
- According to the recent Arctic Refuge Visitor Study Summary, respondents encountered an average of two other groups on their trip, saw or heard four airplanes, and saw an average of one site with evidence of previous visitor use.

Current trends and their implications for public use include:

*Physical Impacts and Perceived Crowding* - Simultaneous visits by both hunting and recreation groups in some high-use areas due to weather, or high demand, have lead to a reported erosion of visitor experiences, user conflicts, and increases in physical impacts such as human waste accumulations.

*Hunter Conflicts* - There are growing tensions between hunting guides and transporters, particularly in the northwest portions of the Refuge.

*Dalton Highway-based Visitation* - There is high probability that the western boundary of the Refuge will continue to become more popular with visitors as awareness of relatively economical Dalton Highway-based access continues to rise. Arctic Refuge managers now consider the Dalton Highway the Refuge's "Frontcountry."

*Polar Bear Viewing* - The opportunity to view polar bears outside of captivity offers a valuable tool for delivering species and land conservation messages, if viewing is practiced in a way that promotes a conservation ethic. The Arctic Refuge is responsible for insuring that commercial uses of its lands and waters, including the emerging opportunity to view polar bears with a commercial guide, are conducted in a way that complies with both the Marine Mammal Protection Act and the Endangered Species Act, and the Refuge is committed to a wide array of partners to manage its commercial guided polar bear viewing program for optimal support of polar bear conservation.

*Packrafting* - The emergence of commercially-manufactured, lightweight, backpack-able inflatable rafts is making rivers and streams that were once un-floatable due to low water or lack of access more available to a range of users. This could potentially change the patterns of use on Arctic Refuge.

## **Arctic National Wildlife Refuge: A Public Use Summary\***

The Arctic Refuge encompasses the traditional homeland of Inupiat and Gwich'in peoples and perpetuates the opportunity for continuing traditional subsistence uses, skills, and relationships with the land. In addition, people from around the state, the nation, and the world seek out the experience of visiting Arctic Refuge. Visitors use the Refuge for many activities including river floating, hiking, backpacking, camping, mountaineering, dog mushing, hunting, fishing, wildlife observation and photography. The exceptionally remote and undeveloped Refuge offers wilderness qualities and opportunities that are unique relative to most other protected natural areas in North America. These opportunities include the illusion of exploring areas where no people have previously been, and the potential of traveling for days or weeks at a time without seeing another person.

Visitors to Arctic Refuge rarely come with the intent of engaging in only one activity, such as hunting, wildlife viewing, or river floating, but rather intend to experience the land, rivers, wildlife, and scenery, all in a wilderness context. Most general hunters come to the Refuge to hunt Dall sheep, caribou, moose, and brown bear. Although a portion of recreational visitors fish during their visits to the Refuge, general fishing is usually not a primary reason for visiting (i.e., visitors usually come for some other purpose, but often fish while there).

This report contains a summary of historic visitor use information compiled for the area now designated within the Arctic National Wildlife Refuge boundary (up to 1997); depicts a general index of recent visitor use patterns (1998-2009) based upon available data; summarizes available harvest data for general hunting and trapping; and discusses current trends in public use with implications for future management practices.

### **I. Summary of Historic Visitor Use**

#### Public Use Prior to 1960

The area that is now the Arctic Refuge has, for many centuries, been used by the Inupiat Eskimos of the North Slope and the Gwich'in Athabascan Indians of the Interior. These people traditionally hunt, fish, trap and use plants to support their subsistence cultures. The first non-indigenous people to travel rivers that are now within the Refuge boundary were British explorers who, in 1826, passed along the Arctic coast in small boats from the Mackenzie River. In the 1840s, Hudson Bay Company traders descended the Porcupine River and established Fort Yukon. They began a trapping economy that continues to this day along south side rivers. At the turn of the century, overflow from the Klondike gold rush brought prospectors to explore the rivers.

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\*Public use of the Arctic Refuge is divided into those uses by visitors (recreational and general hunting uses), and rural residents who rely upon the Refuge for subsistence uses, including subsistence hunting. Subsistence use of the Refuge is not considered "visitor use," and is not quantified in this report. Section III deals only with general hunting and trapping harvest data, available from State harvest records. See Appendix I, the Glossary of Public Use Terms, for a complete list of public use terms used in this report.

Their efforts were not successful and today most evidence of their activity has vanished. Various scientific, geographic and International Boundary Commission expeditions followed. In 1906, E.D. Leffingwell intensively surveyed the Canning River, supported by independent funding. His work is described in a report published by the U.S. Geological Survey (Leffingwell, 1919). Several years later, Dr. R.M. Anderson crossed the divide between the Hulahula and East Fork Chandalar rivers, the first non-indigenous person to do so.

The Chandalar and Sheenjek River drainages were mapped by J. B. Mertie in 1926. In 1939, United States Geological Survey topographer Gerald FitzGerald conducted the last of the Nation's major ground surveys on the Refuge. He mapped the Coleen River by Peterboro canoe and the Porcupine River by plank boat.

By the mid-1900's, various individuals (Dr. Olaus Murie, George Collins, etc.) were conducting studies; groups (National Park Service, Wilderness Society, etc.) were making recommendations; and other organizations (New York Zoological Society, Conservation Fund, Sierra Club, Tanana Valley Sportsmen's Association of Fairbanks, etc.) were lending support for the establishment of a conservation unit in northeastern Alaska. One effect of these efforts was a small but notable increase in recreational use of the area. George Collins led, in 1953, one of the earliest float trips down the Kongakut River (Collins and Sumner, 1953). In 1956, a team of five people (Olaus and Margaret Murie, Bob Krear, George Schaller, and Brina Kessel) spent the summer studying the Sheenjek River Valley as part of their effort to establish a reserve. The year 1957 brought what is believed to be the first ascent of Mt. Michelson, the fourth highest peak on the Refuge (Watt, 1966).

#### 1960 - 1979

When the original Arctic National Wildlife Range was established in 1960, there was still little recreational use. Occasionally, hikers and backpackers visited the area. A few sport hunters went into the Range via airplane during the early 1960s (pers. comm. Refuge staff). The Fairbanks Daily News-Miner reported in 1962 that Dr. Rune Lindgren took a 300-mile backpack trip from Demarcation Bay to Arctic Village. However, very few people were canoeing in the area (Watt, 1966). It is reported that commercial hunting guides began working in the Range as early as the late 1960s (pers. comm. Refuge staff), but use data was limited, especially since the Range was not staffed until September, 1969. It should be noted that any figures given for this period are estimates. Complete, accurate data were not available. The figures also refer only to use within the original Range rather than the Refuge as it exists today.

By the early to mid-1970s, Arctic Alaska and the Brooks Range were receiving considerable national and international attention due to public lands proposals and the 1968 discovery of oil at Prudhoe Bay (Warren, 1980). Use of the area, although still relatively low (less than 1,000 use days per year) was increasing (U.S. Dept. of Interior, 1973). (A use-day is defined as one 24-hour period.) Bush pilot Walt Audi began flying from Kaktovik in 1968, and began offering commercial flight services in 1972 (pers. comm. Walt Audi). Several individuals were known to

hike alone between Barter Island and Arctic Village or wander elsewhere on the Refuge for extended periods (Arctic National Wildlife Range, 1972). People were hiking, mountain climbing, fishing, trapping, photographing, canoeing, boating, camping, and berry picking. Sport hunting for sheep was becoming especially popular. Hunt guide Joe Want began taking horses from Circle to the upper Sheenjek River in the early 1970s, and Marlin Grasser was operating on the Hulahula at around this same time (pers. comm. Refuge staff). The major river valleys (Chandalar, Hulahula, Canning, Sheenjek, and Coleen) were favored routes for most of these users.

A public use study by Ritchie and Childers (1976) estimated that 281 persons visited the area in 1975. More than half of the visitors were hunters. Backpackers had the greatest number of use days, much of it in the upper Hulahula and Okpilak river valleys. Warren (1980) estimated that 248 general hunters and 186 recreational visitors visited in 1977. According to Warren (1980), general hunters accounted for 51% of the use days. Local subsistence users probably accounted for an additional 50% more of the harvest activity (Arctic National Wildlife Range, 1975).

Some people employed the services of guides. Eight to ten guides were thought to be operating in the area in 1974 (U.S. Dept. of Interior, 1974), mostly for general hunting. One recreation guide was issued a permit in 1975. That number increased to five by 1977. A similar level of commercial activity then continued annually through 1979.

## 1980 – 1992

The expansion of the Range into the Arctic National Wildlife Refuge in 1980 ushered in a new era of public use activity. The increase in both guided and private recreation evident during the 1970s continued, but at a faster pace, especially near the end of the decade. Several factors contributed to this increase, including changes brought about by Alaska National Interest Lands Conservation Act, and the State of Alaska's efforts to promote tourism. The factor that probably had the most influence, however, was the heightened public awareness of possible oil and gas development on the Refuge. An increasing number of people expressed the wish to see the Refuge and the coastal plain before oil development was allowed. This was most evident in years when the pressure to open the 1002 Area intensified.

The Refuge became an increasingly important destination for people seeking a unique wildlife and wilderness experience, drawn by the dramatic scenery and remoteness of the mountains and rivers of the Refuge. In the early 1980s, backpacking and camping were the most popular summer activities, followed by river floating. This order was reversed by the end of the decade (Arctic Refuge, 1989). Hunting (both subsistence and general) was the most popular fall activity on the Refuge, as it is today. Wildlife observation and photography were, and continue to be, an integral part of all recreation activities.

Sport fishing occurred (and still does) as a secondary or incidental activity on recreational trips. This is consistent with use data of the time from other wilderness areas (Fullerton, 1976; Gregory, 1976).

Use statistics were scarce in the early 1980's. The Dalton Highway was not yet open to the public, but data was collected in 1983—103 vehicles total / day average (actual count taken at Yukon River Bridge), and in 1984—150 vehicles total / day average (estimate) (pers. comm. State DOT Planning Department).

Commercial air operators (air taxis) proved the best source for visitation data (though permits for air taxi operators were not required until 1987 and some operators were not under permit until 1989). The Refuge estimated 3,450 use days by recreational visitors and general hunters during 1980 and 1981. This number reflects both guided and unguided visitors who were transported by air taxis.

Numbers provided by Audi Air Inc., a primary air taxi service at that time for general hunters and recreational visitors on the North Slope of the Refuge, show some evidence of public use steadily increasing, beginning around 1983. The operator flew 109 people in 1983, 147 in 1984, and 165 in 1985 (Arctic Refuge, 1983-85). However, this was only part of the total use. The number of unreported charters and private aircraft that flew into the Refuge is unknown.

A more formal use survey was conducted by the Refuge in 1986. Using the research assumptions of Warren (1980) and reports from the nine active air taxi operators, the number of recreational visitors and general hunters during the summer of 1986 was conservatively estimated at 515 (reflects both guided and unguided visitors who were transported by air taxis).

Dramatic increases in Refuge use occurred in 1988 and 1989, especially along two main river systems. In the three-year period 1987-89, commercial river use increased by some 325% on the Kongakut River and over 500% on the Hulahula River. Commercial use continued to grow substantially as well. Permits were issued to seven recreation guides and outfitters in 1980. By 1989, the number had increased to 21 guides who ran a total of 48 float or river-based backpacking trips. Group sizes ranged from three to 28. These dramatic increases in the 1980s were a major factor that prompted interest and support for development of a river management plan, which was drafted in 1992 but never formally adopted or implemented.

Only limited visitor information is available for the period between 1992 and 1997, and data collection methods are unconfirmed.

## **II. Recent Visitor Use Patterns (1998-2009)**

### **Overall Known Visitation and Commercial Activity**

Compared to most other land conservation units, the Arctic Refuge is geographically remote and is primarily managed to protect its wilderness qualities (Arctic National Wildlife Refuge Comprehensive Conservation Plan, 1988). With the intent of preserving opportunities for recreation within a wilderness context, Refuge management has not implemented a direct visitor registration system and has no way to contact each entrant. As they have since the Refuge's establishment, visitors retain the freedom to come and go from the Refuge, unhindered by campsite assignments or registration requirements.



One result of this unique visitor opportunity is that Refuge staff is not able to conclusively document total Refuge visitation, nor know from where its visitors originate, though it has been observed that visitors come to experience the Refuge from around the state, the nation, and the world.

Estimates of numbers of recreational visits in the Refuge are based on a variety of factors. Data is obtained primarily from client use reports submitted by guide and air taxi companies as a condition of their commercial special use permits. Client use reports remain the most accurate source of information for quantifying known visitation, since the Refuge now administers a program that requires permitting of all commercial uses.

This reporting requirement provides consistent and precise records of commercially-supported visitor numbers. Permittee reports also provide insights about many aspects of visitor use such as distribution patterns over area and across time, visitation dates, and group sizes. Voluntary reports of visitor use from the Dalton Highway are collected annually from the Arctic Interagency Visitor Center in Coldfoot, Alaska; Toolik Research Station north of Galbraith Lake; and opportunistically from other sources, such as occasional recreational surveys.

With some level of confidence, Refuge managers suspect that visitor information derived from client use reports does document the majority of Refuge visitors. However, managers also suspect that much visitation remains unrecorded. Visitation originating from non-Refuge lands adjacent to the Refuge boundary (such as that from the Dalton Highway or from a village airport) not requiring an air taxi or the services of a guide (those individuals who, without an air taxi service, access the Refuge independently by private plane, boat, or foot) may comprise a notable amount of annual use.

The Refuge currently has no consistent way of documenting visitation by individuals who independently access the Refuge without the commercial services of a guide or an air operator. The Refuge estimates that the total number of reported visitors in 2009, including voluntarily reported non-commercially supported Dalton Highway-based visitors, was approximately 1,000 people (see Figure 1). It is currently estimated that of the known visitation, no less than 12% of total Refuge visitation originates from non-commercially-supported use (see Figure 2) in any given year, but the number of total visitors may be significantly higher, and concentrated within the Atigun Gorge area accessible from the Dalton Highway. Managers at the Arctic Refuge observed a downturn in visitation in 2009 (Figure 1), which may be attributed to the economic recession in the United States, which has most likely decreased overall tourism volume throughout Alaska (McDowell Group, 2008).

There has been a steady increase in the number of commercial permits issued since the 1980s, but even with increasing permit numbers, visitation has generally remained steady since the late 1980s. As stated earlier, recreational guide permits were first issued for the Refuge in 1975 and air taxi permits were not issued until 1987, but since then, the number of commercial permits issued annually has consistently increased (Figure 3).

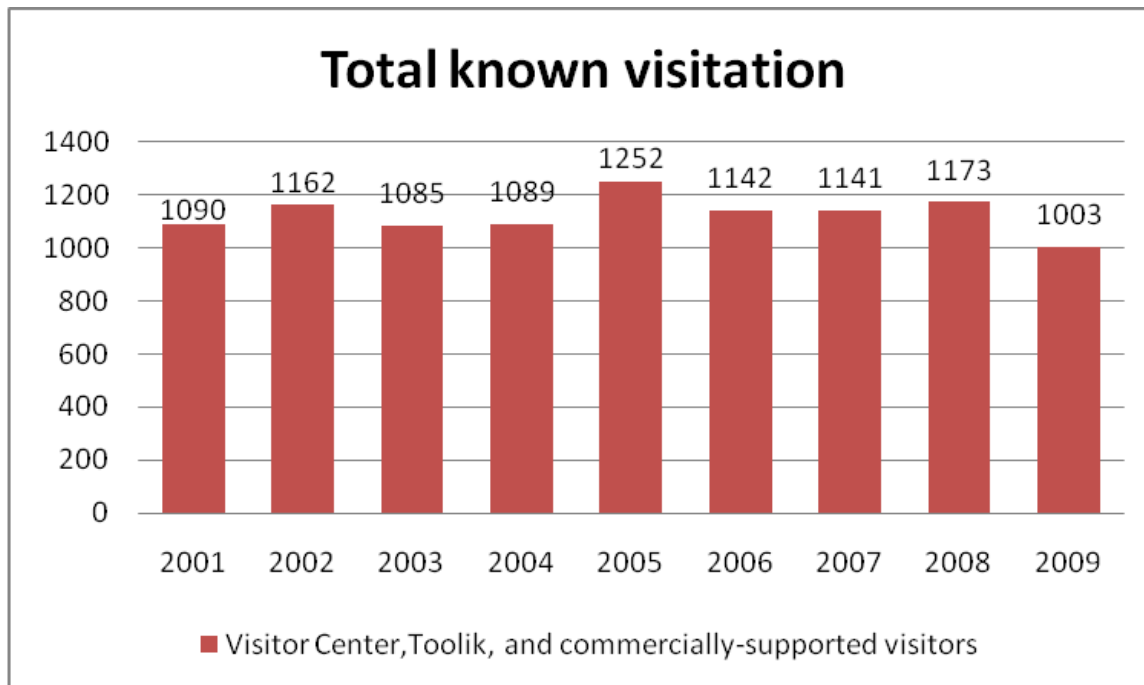


Figure 1. Total known visitation, as reported by all available sources.

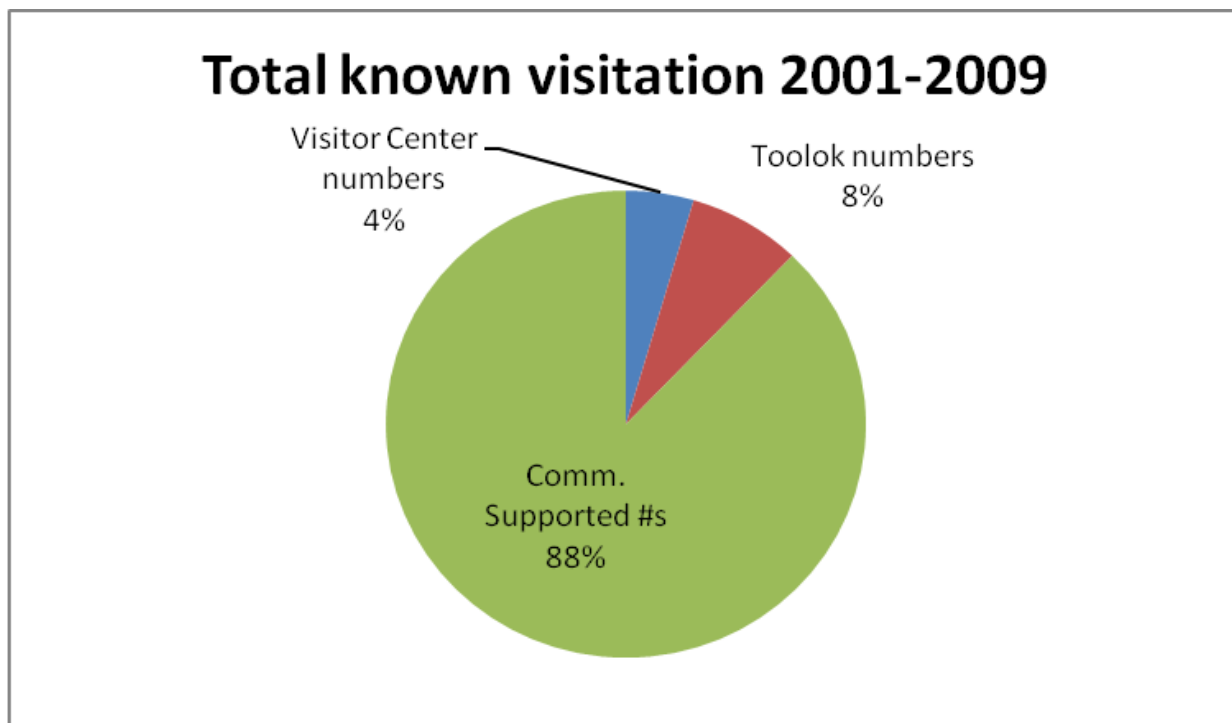


Figure 2. Percentage of known Refuge visitation by source.

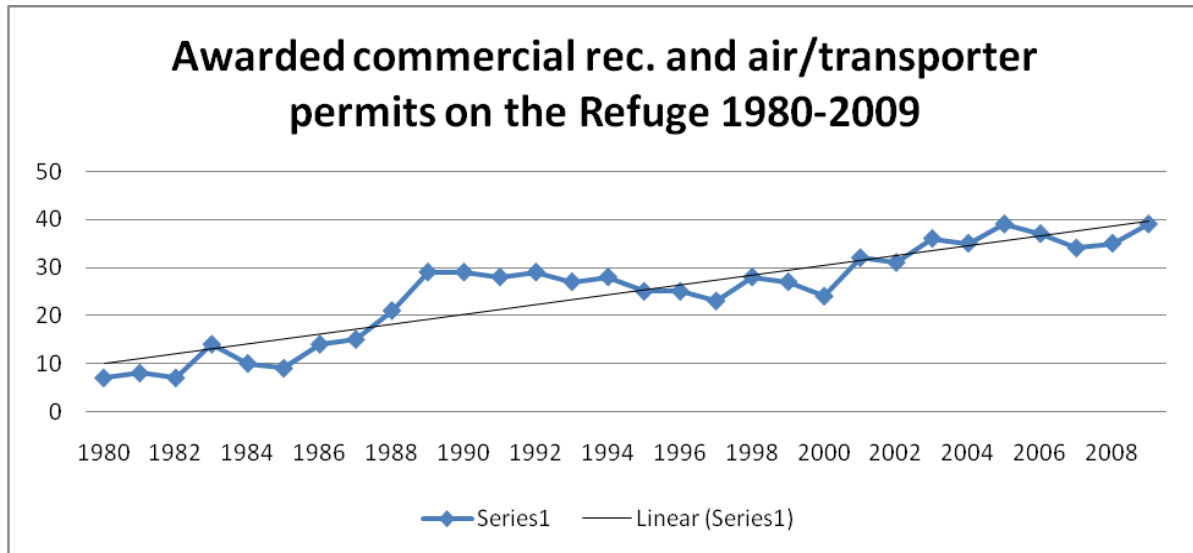


Figure 3: Number of commercially-guided recreation and air taxi/transporter permits by year.

#### Dalton Highway-based Visitation and Estimated Overall Visitation

The Dalton Highway was opened to the public in 1995, and since then has experienced steady increases in visitation (AIVC report, 2009). The highway serves as a significant access corridor to the Refuge, which is situated less than a mile away at Atigun Gorge, an area that has both astounding scenic grandeur and substantial scientific and habitat value. Atigun Gorge and adjacent drainages are also easily accessible from the road, while most other Refuge lands are more remote, rugged, and difficult to reach.

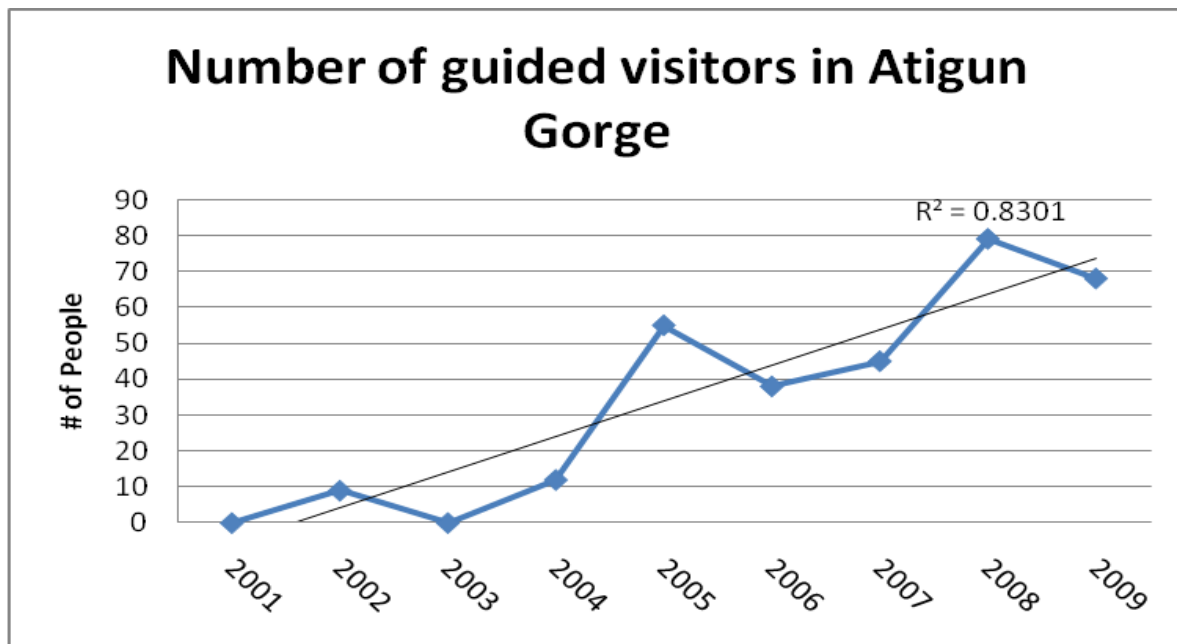


Figure 4: Number of commercially-guided visitors in Atigun Gorge.

While commercially-permitted activity in Atigun Gorge has increased over the years (see Figure 4), there are indications that the rate of increase observed in commercially-supported activity is lower than that of non-commercially supported uses.

Statistical estimates from a recent recreational study of Alaska residents suggest that Dalton Highway-based visitation to the Refuge may be substantially higher than what managers estimate (Stegmann et al., 2008). This study was designed to compensate for the lack of knowledge about recreational patterns of the overall Alaskan population. During the summer of 2007, Stegmann and her colleagues measured the recreation activities, settings, experiences, and benefits associated with summer visitors to the Dalton, Taylor and Denali Highways and the Fortymile National Wild and Scenic River. These areas are managed by the Bureau of Land Management (BLM) in the Central Yukon and Eastern Interior regions of Alaska. The study explored different levels of recreation demand with the purpose of supporting a Benefits-Based Management approach for recreation planning on BLM lands in these regions. Approximately 7% of all Dalton Highway survey respondents named either the area between Atigun Pass and Toolik, or the Galbraith Lake area specifically, as primary destinations (pers. comm. Fix).

Another recent study evaluates potential use of the Dalton Highway. The Alaska Residents Statistics Program (ARSP) (Fix, 2009) was a collaborative study among several Federal and State of Alaska agencies and the University of Alaska Fairbanks. Agencies participating in the ARSP survey included the U.S. Forest Service, National Park Service, Bureau of Land Management, Fish and Wildlife Service, Alaska Department of Transportation, and the Alaska Department of Fish and Game.

This study measured travel around the state, and participation in activities, including Alaska resident travel to the Dalton Highway Corridor north of Atigun Pass and to the Arctic Refuge. The goal of the ARSP survey was to gather information regarding Alaska residents' recreational travel, including, but not limited to: recreation activities in which they participated throughout the state; use of facilities and types of areas such as undeveloped backcountry, campgrounds, and visitors centers; visitation to public lands; recreation areas they no longer visit due to possible displacement; significant activities and reasons for participating in those activities; factors that contribute to quality of life, and demographic characteristics including how long they have lived in Alaska and where they lived prior to moving to Alaska.

Though the data on Dalton Highway are contained within the Northern Region, and include all areas north of the Brooks Range between Gambell and the Canadian border, this study does provide limited insights into the gap of knowledge about where and how residents recreate in Alaska, which can aid in long term recreation planning. A significant percentage (11%) of the residents of Interior Alaska who responded to the survey said that they visited areas accessible from the Dalton Highway, including Arctic Refuge. More than 92% of visitors to this area reported that they came between the months of June and November, while 75% said they came between the months of December and May. Food gathering and snow machining were the activities ranked highest for the Northern Region off the Dalton Highway. Further analysis of the data could identify the towns of origin of survey respondents.

The size of the Refuge, and its unlimited number of entry points, make it difficult to estimate the total number of independent (non-commercial) visitors who come onto the Refuge. In addition to the estimated Dalton Highway-based visitation numbers, managers believe the number of total visitors to the western boundary area of the Refuge may be notably higher, and concentrated within the Atigun Gorge area accessible from the Dalton Highway (visitor statistics from Arctic Refuge web site, USFWS data).

#### Current Trends and Patterns in Commercially-supported Visitation (2001-2009)

Estimating overall Refuge visitation and Dalton Highway-based visitation at this time would produce a much less precise estimate than using the more accurately documented numbers derived from commercial operator reports. For this reason, the remainder of this section of the report, which summarizes current visitation trends and patterns, is based only on data for commercially-supported visitation. The remainder of the figures in this section of the report, unless clearly labeled otherwise, only reflect general hunting/fishing and recreational visitation to the Refuge that is commercially-supported and reported by permitted guides or air operators. In 2001, the instructions for reporting client use were clarified and enforced to obtain consistent reporting patterns. For this reason, visitor use numbers in this report should be considered as a general index of minimum Refuge visitation.

Starting in 2005, all data from client use reports submitted by permit holders has been entered annually into a visitor use database and is accurate and precise within the limits of the reporting format. Data for 2001-2009 is now contained in the database, but the database lacks some legacy guided hunting visitor use data for some years. All legacy recreational visitor use data from 1998 to 2001 is entered into the database, but contains varying levels of accuracy prior to 2001.

The database, with its capacity to generate a variety of visitor use reports, has become a powerful tool for allowing managers to evaluate visitor use trends (by location, activity, unit of time etc.). It is important, however, to understand the assumptions underlying these reports and the constraints within which the data must be viewed. For the remainder of this report, please note that the data expresses an absolute minimum index, as it may not currently reflect all reported use of the area. Additionally, one must consider that database tabulation of visitor numbers and their trip lengths is based upon air operator reports of passenger drop-offs and the number of days from drop-off to pick-up. If a visitor enters the Refuge by non-commercial means and is then picked up by an air operator when leaving the Refuge, his/her use will not be accounted for in visitor use number tabulation, since the choice had to be made between tabulating visitation based upon drop-off or upon pick-up. By all accounts, tabulating by drop-off minimizes the overall number of visitors missed.

Using this method, it is understood that a small number of visitors may be missed by the tabulation limitations of the database. Nonetheless, managers are confident that the public use numbers tabulated and reported herein are an accurate general index of commercially-supported visitor use.

Overall, commercially-supported visitor numbers from 2001 to 2009 are thought to have remained stable, with estimates ranging between 852 and 1128 each year (Figure 5). This calculation includes all visitors (recreational and general hunting).

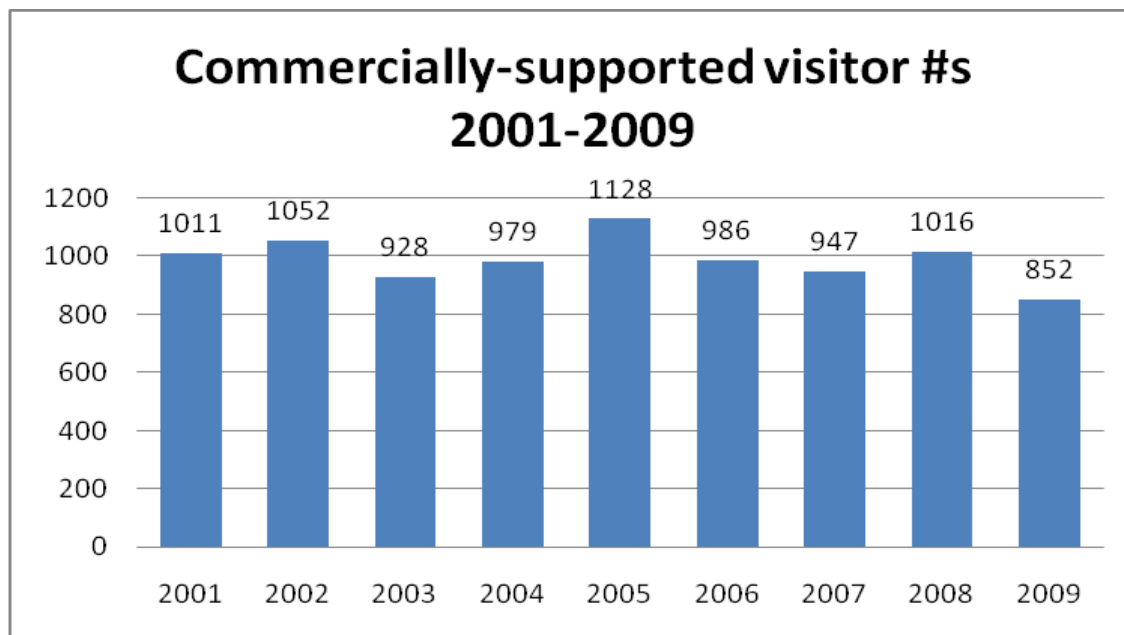


Figure 5. Refuge visitors commercially-guided and/or flown (air taxis and transporters).

Across activity types, more than half of the commercially-supported visitation is guided. Recent numbers show that guided visitation is down, while unguided visitation is up (Figure 6).

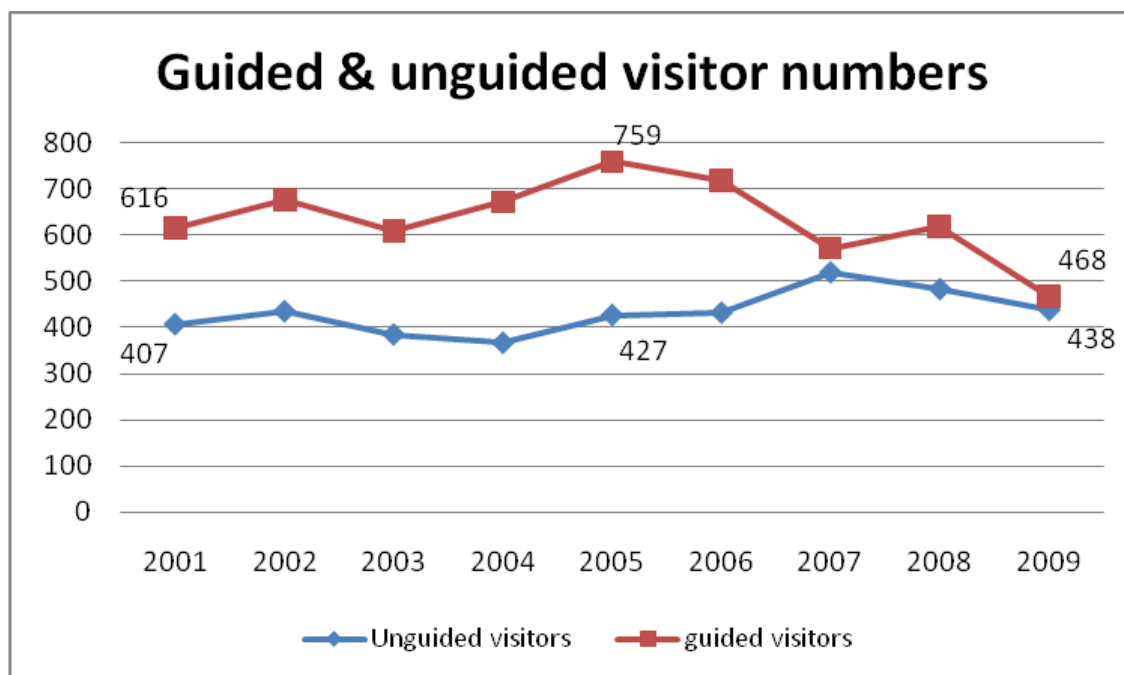


Figure 6. Commercially-supported guided vs. unguided visitation—all activity types.

### Use by Activity Type

For the tables and figures within this report, the activity-type for recreational (non-hunting) visitors is identified by the primary activity (hiking/backpacking, river floating, etc.), even though they may also be engaging in activities such as wildlife observation or photography. Hunters are also river-floaters, hikers, or base-campers, but their activity-type is consumptive, so is categorized as “big game hunting.” When combining all visitor use, the four primary activities within the Refuge are general hunting, river floating, backpacking, and wildlife observation (including photography, birding and polar bear viewing). Some other visitor activities within the Refuge include mountaineering, dog mushing, sea kayaking, photography, bird watching, and fishing.

The majority of visitors float rivers, while hiking/backpacking and hunting comprise other major user types (Table 1, Figure 7). When guided recreation permittees report their client use, they include both the number of clients and guides. When hunting guide permittees report their client use, they only report the number of clients. Therefore, visitor use numbers do not include hunting guides. Data from 2007-2009 show that approximately twice the number of hunting clients than hunting guides visited the Refuge—there was an average of 46 hunting guides for 85 clients in each of those 3 years. Because of these different reporting methods, the total number of commercially-supported hunting-related visitors is under-reported when compared to the total number of commercially-supported recreation-related visitors, since one data set excludes guides and the other includes them.

On average, it appears that hunters make up 28%, and recreational visitors make 72% of the total number of commercially-supported visitors (Figure 7).

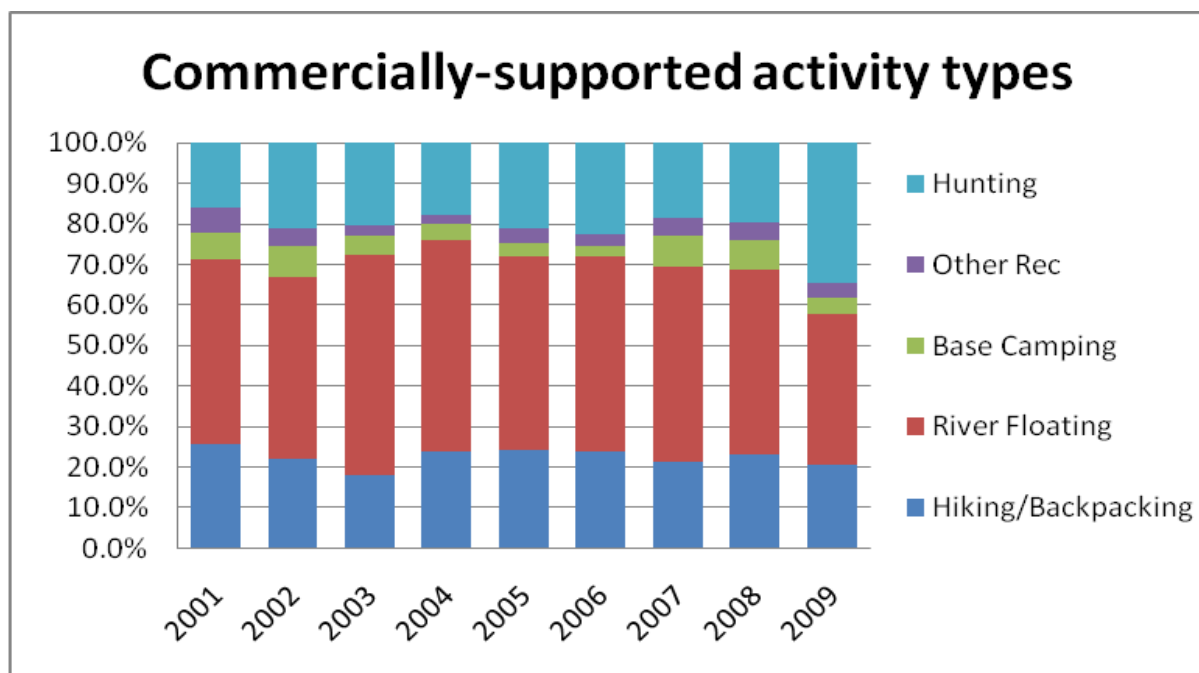


Figure 7. Commercially-supported visitation (guided and unguided) by activity type.

Table 1. Summary of commercially-supported visitors by activity type and year.

Activity Type	Number of Commercially-supported Visitors by Year									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
<b>Total Commercially-supported Visitors</b>	1011	1052	928	979	1128	986	947	1016	852	988.78
Guided Visitors	604	617	543	612	701	554	428	533	414	556.22
Unguided Visitors	407	435	385	367	427	432	519	483	438	432.56
Use Days	7071	8079	7299	7567	7512	8358	8701	8707	8435	7969.89
Guided Recreation Visitors	592	565	480	561	643	489	344	446	331	494.56
Unguided Recreation Visitors	208	247	248	238	221	276	272	215	214	237.67
<b>Total Recreation</b>	800	812	728	799	864	765	616	661	545	732.22
Guided Hunters	12	52	63	51	58	65	84	87	83	61.67
Unguided Hunters	141	165	122	122	171	156	223	259	206	173.89
<b>Total Hunters</b>	153	217	185	173	229	221	307	346	289	235.56
Hikers/Backpackers	246	228	165	231	266	236	160	189	172	210.33
River Floaters	433	462	497	508	522	473	366	376	310	438.56
Basecampers	64	79	42	39	35	25	56	60	33	48.11
Other Recreation	57	43	24	21	41	31	34	36	30	35.22
Unknown	58	15	0	2	6	0	17	0	2	11.11
Other Non-recreation	0	8	15	5	29	0	7	9	16	9.89

Because the air space above the Refuge is regulated by the Federal Aviation Administration, not the Refuge, Commercial flight-seeing trips are not currently monitored or quantified unless the pilot lands on the Refuge. If commercial flight-seeing trips were to land on the Refuge, the information would be reported in client use reports submitted by the permitted commercial air operators, who are required to report all Refuge landings.

#### *Access and Geographic Use Distribution*

The Refuge covers a vast area, providing visitors with seemingly unlimited opportunities to find solitude and experience wilderness. However, Refuge access, use levels, and modes of transport often occur within particular river corridors, based on the water volume of the river and the topography of the river valley. In addition, the primary means of access into and out of the Refuge is by aircraft, which can only land where ground topography or lake size are appropriate. The number of useable access sites are therefore limited. Wheeled aircraft are predominantly used throughout the Refuge and particularly on the North Slope, though float planes are used for access occasionally. Motorboat use by visitors, which is generally not common, occurs almost exclusively on the south side for fishing and hunting. However, a few motorboats are used for polar bear viewing along the Arctic coast near Barter Island and on rivers accessible from the



Dalton Highway. Motorized boats are also an important means of travel for local residents conducting subsistence activities. Non-motorized boats and inflatable rafts are both commonly used where water depths permit. Rafts are the normal means of travel for river floaters, although kayaks and canoes are sometimes used.

Refuge rivers often have open treeless shorelines, allowing recreational visitors to be aware of other groups, even over long distances. Hikers and floaters each tend to make use of the same primary aircraft access sites, mostly along rivers. However, hikers do not normally travel along the rivers. Instead they traverse side valleys, ridge tops and mountainsides, encountering rivers and floaters only intermittently. As a result of all these circumstances, concentration of use and overlap around primary access sites can occur, but there is little competition for campsites and few encounters between the two user groups away from access and egress sites.

Routes leading into and out of major river valleys are popular with hikers. The Refuge has many other popular hiking areas, especially north of the Brooks Range. The exact amount and location of hiking activity within river corridors is difficult to determine, since visitor use is tracked by access location, rather than by travel route.

Wherever multi-night camping occurs on non-durable surfaces, there is potential to concentrate recreational use impacts. Since south side drainages are generally more durable and therefore useable for a longer period of time than those rivers situated north of the mountains, this concern is mostly applicable to North Slope upland-based activities, such as recreational hiking and hunting.

On average, where locations are known, about 77% of overall commercially-supported visitation occurs north of the Brooks Range, while about 23% occurs on the south side. Nearly one-quarter (21%) of the commercially-supported visitors to the Refuge visit the Kongakut River drainage on the north side (Table 2). A number of concerns about issues related to Kongakut visitation have been identified by visitors and by Kaktovik residents.

The other North Slope river drainages most commonly visited include the Canning River (Marsh Fork-Canning: just over 8%; Main Stem-Canning: over 4%), Hulahula River (just under 9%), and Jago River (5 %). South of the Brooks Range, the Sheenjek River is most commonly visited, hosting on average 9% of the commercially-supported visitors to the Refuge. The Coleen River also sees notable commercially-supported south side use (nearly 4%) ( Table 2).

Table 2. Total number of commercially-supported visitors on each river drainage, by year.

Total Number of Visitors by Year on Rivers											
River Drainage	2001	2002	2003	2004	2005	2006	2007	2008	2009	Grand Total	Percent
Kongakut River	187	273	296	267	272	247	234	213	177	2166	21.46%
Sheenjek River	177	137	114	66	101	99	84	71	63	912	9.04%
Hulahula River	125	90	91	90	126	106	81	97	60	866	8.58%
Canning River-Marsh Fork	89	77	78	107	78	76	107	137	86	835	8.27%
Jago River	87	81	37	42	90	67	26	34	43	507	5.02%
Canning River	26	52	40	92	57	23	43	49	65	447	4.43%
Coleen River	48	59	47	40	38	32	45	50	36	395	3.91%
Aichilik River	96	74	3	8	35	28	12	20	37	326	3.23%
Atigun River		9		44	55	38	45	79	56	313	3.10%
Ivishak River	31	19	13	25	14	14	54	45	29	270	2.68%
Wind River	25	11	19	25	38	26	40	42	44	244	2.42%
Guided Hunt Location Unk		30	35	41	58	63	1		3	231	2.29%
Junjik River	14	12	22	16	10	27	19	25	23	170	1.68%
Sadlerochit Mountains	22	13	22	23	31	34	4	16	5	168	1.66%
Chandalar River-East Fork	9	11	15	28	12	15	9	17	23	139	1.38%
Turner River	9	1	7	19	19	18	18	8	2	108	1.07%
Joe Creek	14	7	14	8	20	10	11	10	14	101	1.00%
Beaufort Sea Coast	15	16	9	9	19	17	7	3		95	0.94%
Sagavanirktok River	13	14	9	2		2	15	20	14	89	0.88%
Sadlerochit River		10	9		8	8	22	12	3	83	0.82%
Chandalar River		9		2	2	6	4	11	15	72	0.71%
Ribdon River		4	3	3	4	15	15	22	17	52	0.52%
Katakturuk River		23	7		4		15		3	49	0.49%
Chandalar River-Middle Fork		6	8		2	2	7	9	13	47	0.47%
Porcupine River	11		10		11		3		8	43	0.43%
UNKNOWN	9	5	10	4	4					32	0.32%
Firth River			10	6		4		3		23	0.23%
Okpilak River	2	3			11	2	3		2	23	0.23%
Accomplishment Creek				2	2	3	5	6	4	23	0.23%
Echooka River				1			11	5	6	22	0.22%
Ekaluakat River				1	7	2	2	5		17	0.17%
Egaksrak River				9			2	5		16	0.16%
Chandalar River-North Fork		6								6	0.06%
Marsh Creek	2						3			5	0.05%
Old Crow River						2		2	1	5	0.05%
Kavik River				1						1	0.01%
Total # of Visitors per Year	1011	1052	928	981	1128	986	947	1016	852	8901	

Group size can dramatically affect resource conditions and people's expectations for solitude in a wilderness setting, especially in areas affording distant views. Commercial groups were restricted to no more than 10 individuals on rivers and 7 on land routes in 2001. Since then, these group sizes have been recommended to independent visitors when possible. Reports of Dalton Highway-based hiking visitation indicate that unguided groups often exceed the recommended group size limit within the Atigun Gorge area.

A weighted average of user-types for 2009 shows that commercially guided or transported recreational visitors spend, on average, about nine days in the Refuge in groups that average around five individuals. (The calculation of this weighted average excludes guided hunters because hunting guides are not required to provide group size information. This calculation also excludes available commercial visitation data for drop-off-only visits, since including this component of the data in the tabulation would falsely skew group sizes to a number lower than the actual.)

Records indicate that the Kongakut River receives the majority of the Refuge's river floating activity, and, compared to the overall Refuge average group size and trip length, groups on the Kongakut are slightly larger and, in recent years, stay a little longer than average (Table 3). The Sheenjek River, however, is generally visited by much smaller groups than other Refuge rivers, and stays by Sheenjek River floaters are days longer on average (Table 3). Overall, except for the Canning River which has shown slightly increasing use since 2001, visitation among the four most-visited rivers is down in recent years (Figure 8).

Table 3. Commercially-supported use on the four most visited Refuge rivers.

River	Number of Commercially-supported Visitors By Year for Most Visited Rivers*									
	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average
Canning & Marsh Fork										
Number People	115	129	118	199	135	99	150	188	174	145.22
Total Guided	73	70	57	118	66	40	77	115	71	76.33
Total Unguided	42	59	61	81	69	59	73	73	103	68.89
Average Group Size**	4.07	4.3	4.37	4.42	4.09	3.96	3.74	4.65	3.88	4.16
Average Trip Length***	8.29	9	8.57	8.44	8.8	9.35	8.61	8.44	8.89	8.71
Floater	64	86	72	142	72	76	68	109	85	86.00
Hikers	21	26	31	10	13	9	22	8	23	18.11
Hunters	26	12	9	33	40	12	57	60	56	33.89
Others	4	5	6	14	10	2	3	11	10	7.22
Hulahula										
Number People	125	90	91	90	126	106	81	97	50	95.11
Total Guided	89	76	71	60	98	54	43	54	34	64.33
Total Unguided	36	44	20	30	28	52	38	43	22	34.78
Average Group Size	4.63	3.82	5.67	4.53	5.00	4.60	3.60	4.00	4.20	4.45
Average Trip Length	9.79	8.88	9.41	9.87	9.72	9.68	7.53	7.66	7.41	8.88
Floater	95	57	75	76	111	86	38	48	26	68.00
Hikers	10	7	0	7	0	11	3	18	6	6.89
Hunters	10	22	10	7	12	9	23	25	16	14.89
Others	10	4	6	0	3	0	17	6	2	5.33
Kongakut										
Number People	187	273	296	267	272	247	234	213	162	239.00
Total Guided	142	210	209	211	219	185	135	148	105	173.78
Total Unguided	58	63	87	56	53	62	99	65	57	66.67
Average Group Size	6.17	5.25	5.10	5.45	4.73	5.04	4.52	4.51	4.64	5.05
Average Trip Length	9.03	9.02	8.53	10.10	9.09	9.70	9.06	9.71	9.34	9.29
Floater	115	222	247	207	197	203	188	150	111	182.22
Hikers	31	17	33	47	52	24	11	26	12	28.11
Hunters	6	8	9	8	11	15	22	17	23	13.22
Others	35	26	7	5	12	5	13	20	16	15.44
Sheenjek										
Number People	177	137	114	66	101	99	84	71	61	101.11
Total Guided	99	59	31	19	32	29	16	9	13	34.11
Total Unguided	78	78	83	47	69	70	68	62	48	67.00
Average Group Size	4.54	4.15	3.56	2.87	3.12	3.81	2.85	3	2.67	3.40
Average Trip Length	9.95	11.43	10.21	9.1	9.71	10	10.58	9.86	10.6	10.16
Floater	93	59	76	42	58	45	22	29	18	49.11
Hikers	44	30	6	0	14	8	7	2	9	13.33
Hunters	20	48	27	22	29	39	49	40	29	33.67
Others	20	0	5	2	0	7	6	0	5	5.00

\*Four most visited rivers on Arctic NWR.

\*\*Does not include guided hunters to calculate Average Group Size. Data for Guided Hunt are per person, not per group (recorded as group size = 1).

\*\*\*Does not include drop-off only trips to calculate Average Trip Length (recorded as drop-off only trips = 1 day).

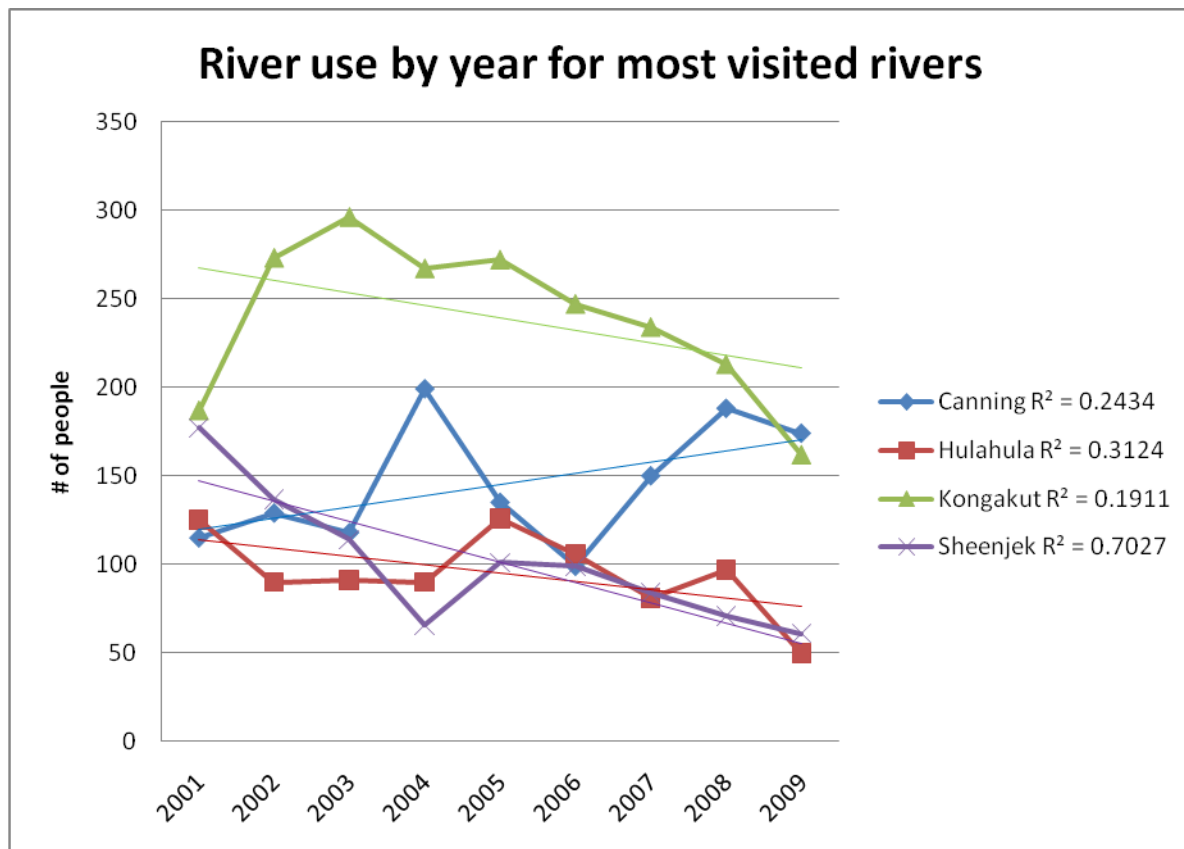


Figure 8. Comparative use of the four most visited Refuge rivers.

### *Temporal Use Distribution*

Most visits to the Arctic Refuge occur during the summer and fall seasons, within the months of June, July, August, and September. The prime recreational season is short due to weather and water conditions, with a total of six to eight weeks when water levels are adequate for floating and weather is ideal for backpacking. Figure 9 depicts the most-visited times of year for the Kongakut River. As mentioned above, Caribou Pass on the Lower Kongakut is probably the most visited wildlife viewing site on the Refuge and draws people to witness the migration of the Porcupine caribou herd through the area.

With long periods of summer daylight, rivers could be floated in three to five days, and groups end up spending considerable time relaxing and hiking the countryside. The net effect is that groups can leapfrog each other their entire trip.

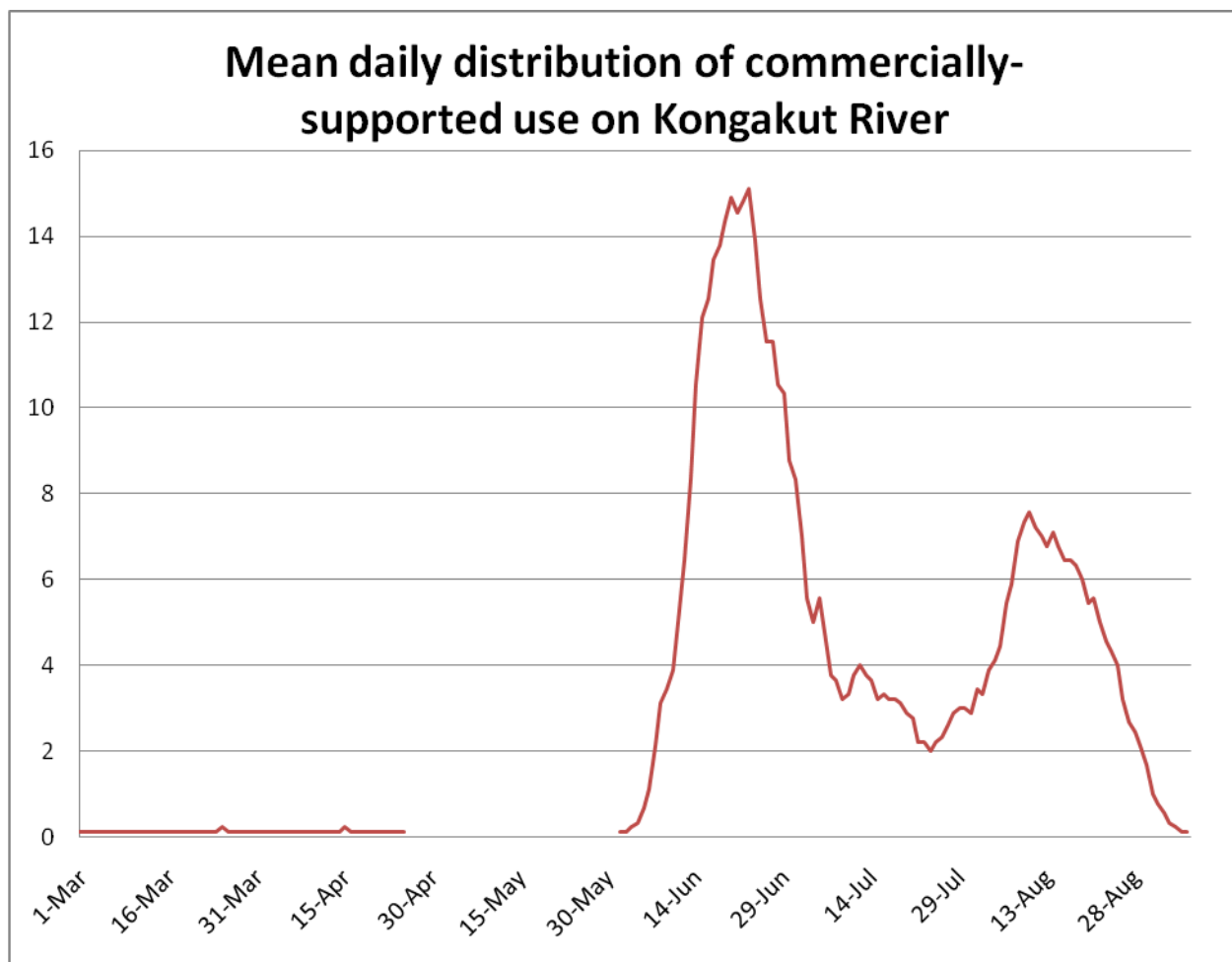


Figure 9: Mean Daily Distribution of Use on Kongakut River Drainage between June and September.

### III. General Hunting and Trapping

The Alaska Department of Fish and Game is the agency responsible for regulating general hunting, fishing and trapping throughout the state. General fishing is not addressed in this section because it is not a prominent visitor use of the Refuge and little fishing data is known. A few recreational visitors ask about the potential for fishing on float trips, especially for Dolly Varden. However, sport fishing is generally unproductive on most of the North Slope during summer because most adult fish are feeding in marine waters, and the water on many rivers is silted by glaciers. Therefore, few, if any, recreational visitors travel to the Refuge primarily to fish. Unlike many other areas of Alaska, guided sport fishing trips have not occurred on the Refuge.\*

\*In 2006, a Guided Sport Fishing Special Use Permit was issued, but the guide did not operate.

The following information summarizes what general hunting and trapping data is known, the limitations of this data in helping to determine general consumptive uses of the Refuge, and some data specific to Refuge general hunters.

Data available for subsistence harvest, including hunting and trapping under the Federal Subsistence Harvest of Wildlife Regulations, is very limited. Detailed Subsistence Community Use Profiles and Harvest Studies prepared by the State Subsistence division have not been conducted for communities near Arctic Refuge since the 1980s. There is a significant lack of subsistence-based land use, community use, and harvest information. Also, rural village residents are reluctant to use State or Federal harvest report forms. For these reasons, the remainder of this section does not contain information pertaining to federally-qualified subsistence use of the Refuge.

### General Harvest Data Background Information

The State of Alaska is divided into 26 different Game Management Units (GMU). These units are then divided into subunits, which are identified with letters. Arctic Refuge is comprised primarily of GMUs 25A, 26B and 26C (Figure 10: note that GMUs 25A and 26B include portions of non-Refuge lands). Data collected for units 25A, 26B and 26C encompass the majority of Arctic Refuge and depict the general hunting trends within the Refuge, but it should be noted that a small portion of Arctic Refuge, in the upper Porcupine River drainage, lies within GMU 25B. However, because the vast majority of Refuge hunting occurs within the other GMUs, and because we cannot differentiate between hunters who hunted on Arctic Refuge and hunters who hunted on other lands, collecting data for GMU 25B would greatly skew the data, so data for GMU 25B was not collected.

The information in Figures 11 to 18 below was gathered exclusively from the Alaska Department of Fish and Game (ADF&G) Wildlife Information Network (<http://winfonet.alaska.gov>), which is an online database housing all general hunt reports, harvest records and sealing information.

There are strengths and limitations for conducting information searches from the Winfonet database. The database only captures records for 1) hunters who properly obtain, fill out, and return harvest tickets; and for 2) trappers who have their furs sealed. A harvest ticket reflects information such as the hunter's name, hunting location (does not indicate land status, such as Arctic Refuge or State land), number of animals harvested (may be 0), and harvest dates or dates hunted. Whether or not the hunter harvests an animal, the harvest ticket must be returned to the Alaska Department of Fish and Game. A sealing certificate reflects information such as the number and location of animals harvested. Sealing certificates are only required when an animal is harvested. Trapping effort is therefore not available.

By tracking information from harvest tickets and sealing certificates, ADF&G can follow hunting and trapping trends and adjust management strategies accordingly. However, some hunters and trappers (the number or proportion is unknown) do not comply with the harvest ticket or sealing regulations, so their activity cannot be tracked.

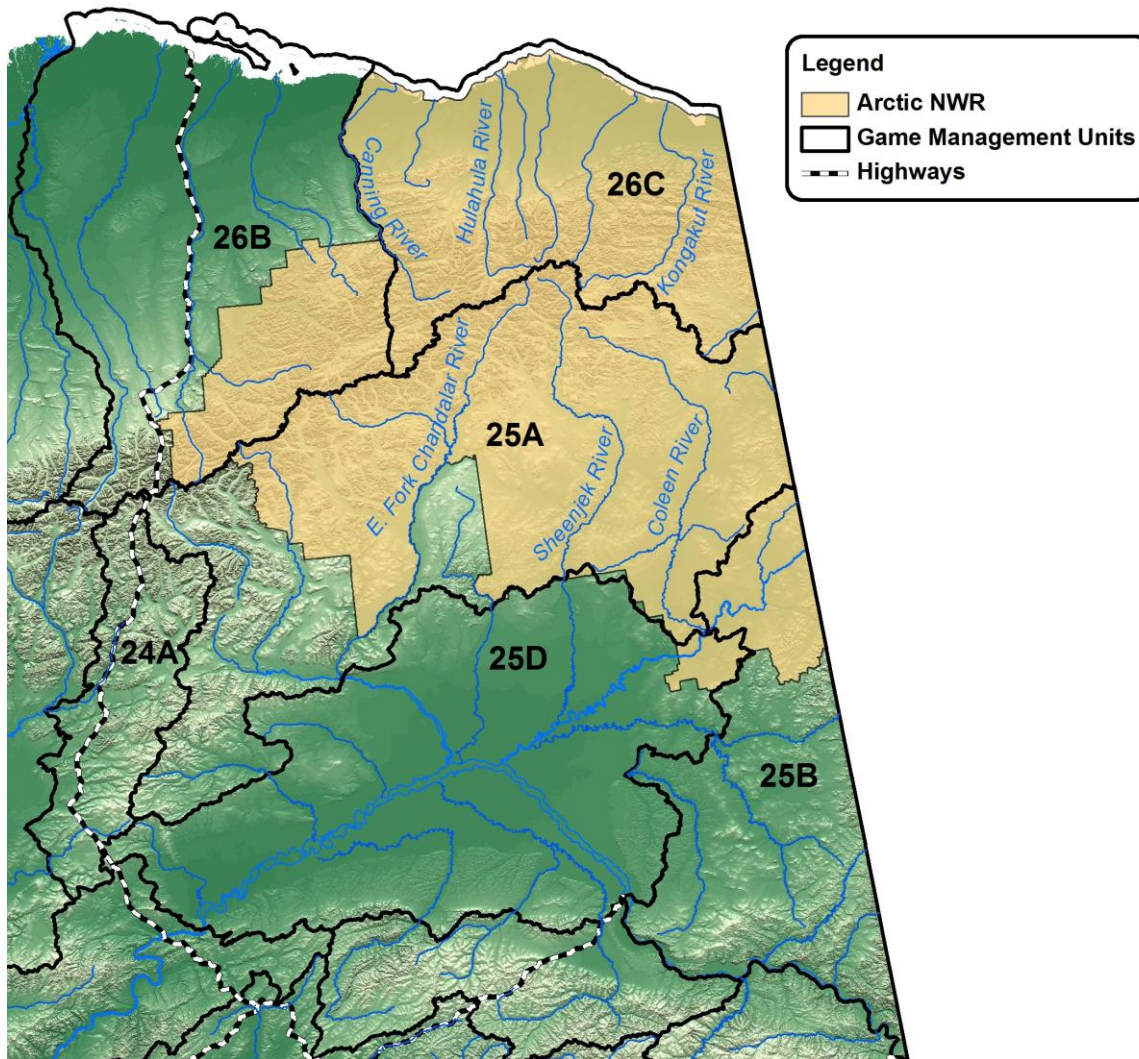


Figure 10. Map of Game Management Units (GMUs) in northeast Alaska.

When reviewing the information for Arctic Refuge in the graphs below, the following should be noted:

- 1) Approximately 1/3 of lands within GMU 25A and approximately 2/3 of lands within GMU 26B are outside the Refuge. State lands within GMU 25A receive substantial sheep hunting pressure. GMU 26B includes the Dalton Highway Management Corridor Area, which is a popular and road-accessible caribou hunting destination and accounts for most of the caribou hunting efforts in GMU 26B. Caribou in this unit are most likely associated with the Central Arctic caribou herd.
- 2) Trapping activity is believed to be higher than what these numbers represent because harvest by people who did not have their furs sealed is not represented in this data set. Trappers, whether rural or non-rural residents, are required to have their furs sealed, yet many rural residents do not.



- 3) The trapping data reflect the number of sealing certificates and the number of animals harvested. Again, the number of trappers is not reflected. The harvested species included in this section are lynx, wolf, wolverine, and otter. The number of trapping sealing certificates does not reflect the number of trappers. Instead, it reflects the number of times a trapper had furs sealed and/or the different species of furs the trapper had sealed. Trappers often seal furs multiple times throughout the trapping season. A new sealing certificate is issued each time a trapper seals a fur or multiple furs of the same species. For example, if a trapper has a wolverine and three wolves to be sealed, one certificate would be issued for the wolverine and a separate certificate would be issued for the three wolves, which would specify that three wolves were sealed. One week later, the same trapper could return to have three more hides sealed, at which time more sealing certificates would be issued.
- 4) Numbers for black bear, brown bear, and trapping records indicate the number of animals harvested, but do not indicate the number of hunters or trappers. The State of Alaska does not require a report for unsuccessful bear hunting or trapping efforts: it only requires post-harvest sealing, which is done by ADF&G or a designated representative.
- 5) Many of the hunters on Arctic Refuge hunt various species during the same hunt. It is common for a hunter to have sheep, caribou and grizzly tags for a north side hunt or moose, caribou and grizzly tags for a south side hunt. Therefore, the number of hunters physically present on the Refuge is much lower than the total of all of the hunting reports for each species combined.
- 6) A hunter can have multiple harvest tickets for caribou. The hunting information does not reflect the number of hunters: it reflects the number of submitted harvest tickets. Therefore, the number of hunters present on the Refuge is lower than the numbers reported.
- 7) The Wildlife Information Network provides data; it does not provide inferences to trends. Many variables affect hunting and trapping efforts, which makes it difficult to determine trends.

## Harvest information

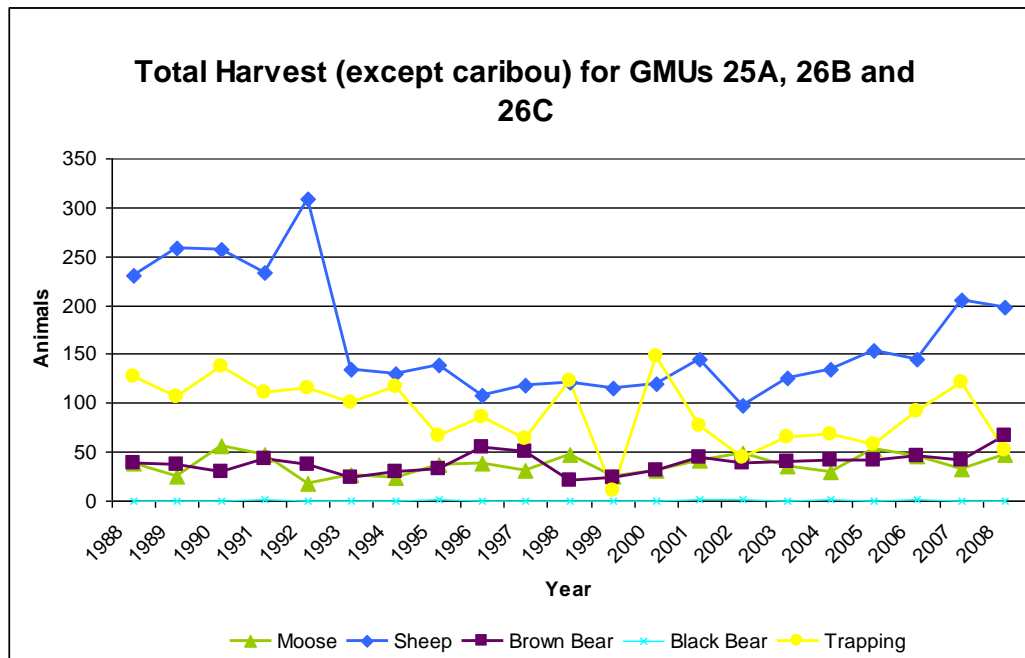


Figure 11. Harvest information (excluding caribou) from Game Management subunits encompassing Arctic Refuge.\*

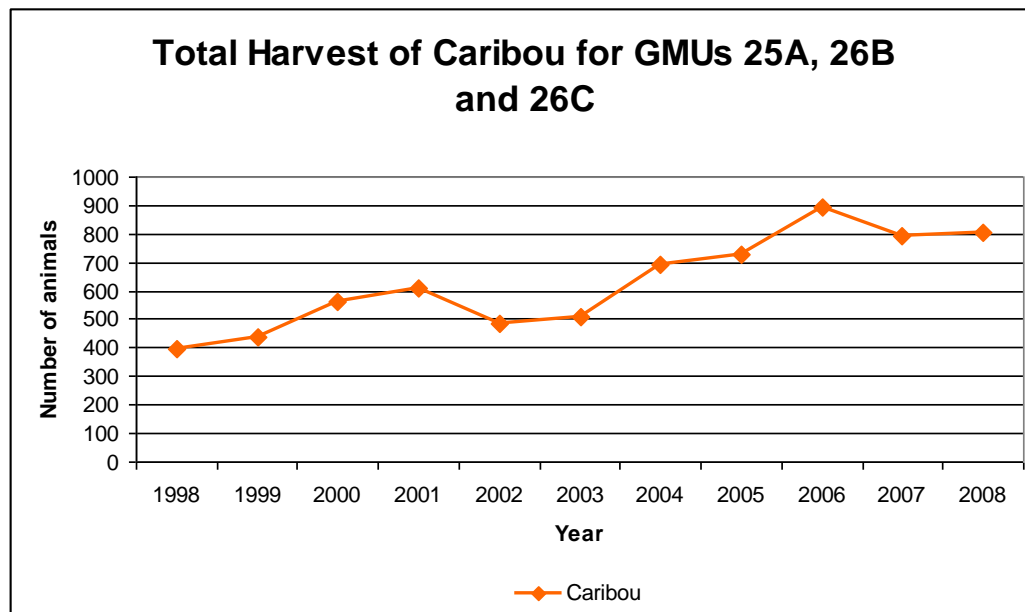


Figure 12. Caribou harvest information from Game Management subunits encompassing Arctic Refuge.

\*Caribou data appear separately, in Figure 12, because 1) data were only available for ten years, 1998-2008; and 2) many more caribou than other species are harvested each year, so leaving caribou data in Figure 11 would have made it difficult to discern annual variations for the other species.

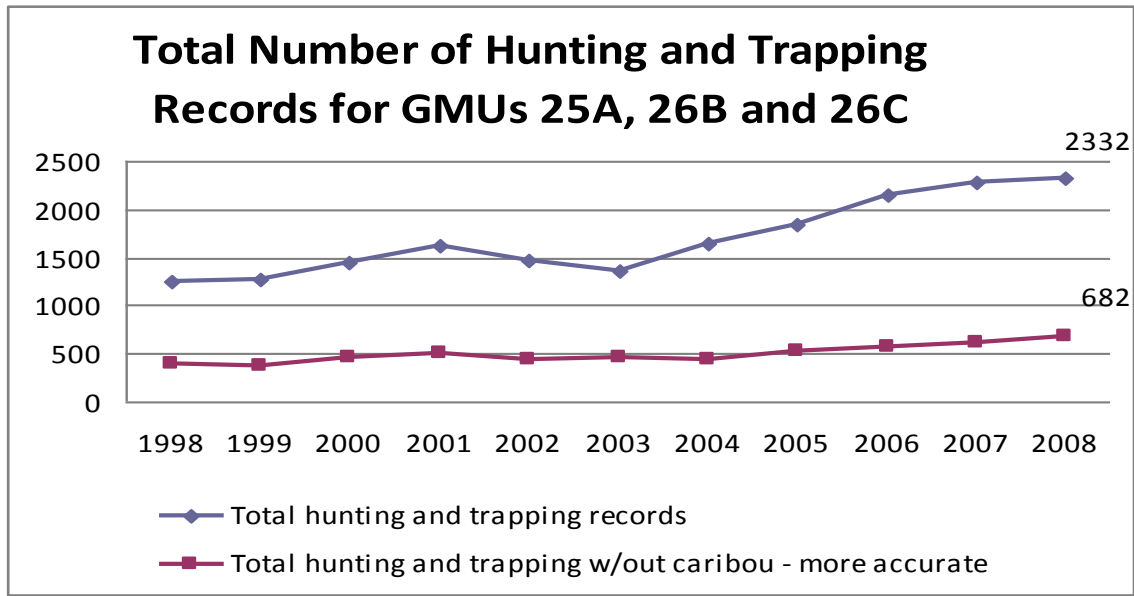


Figure 13. Hunting (excluding caribou) and trapping records (not number of hunters and trappers) from Game Management subunits encompassing Arctic Refuge.\*

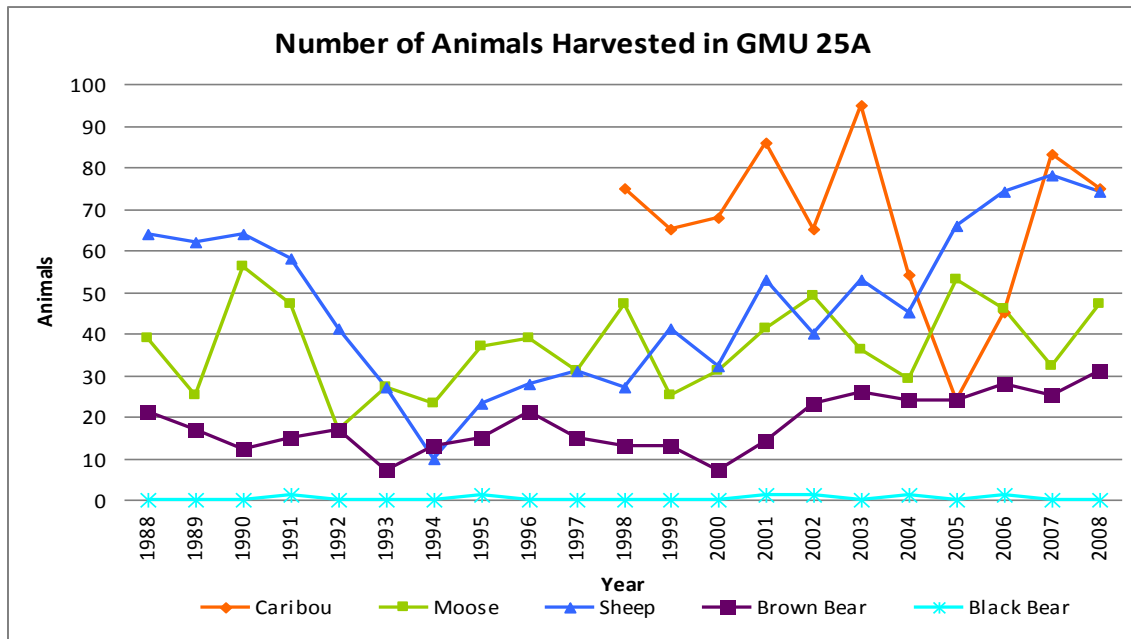


Figure 14. Hunting records from Game Management subunit 25A. (Two-thirds of 25A fall within Arctic Refuge.)

\*Most of the caribou hunting occurred off Refuge lands, so caribou records have been removed to provide more accurate use trends within Arctic Refuge.

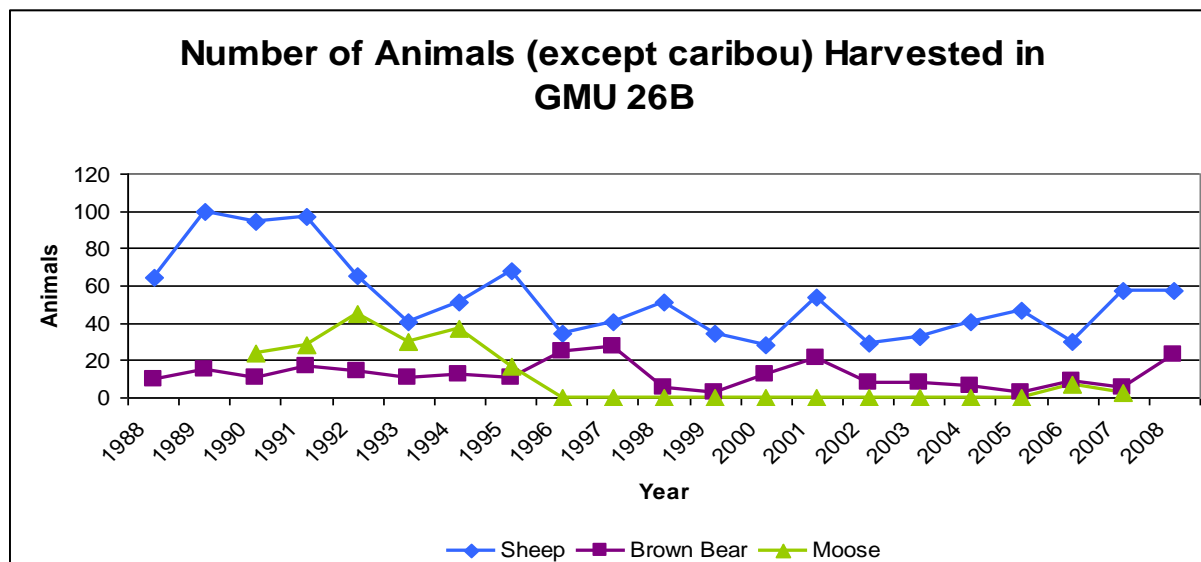


Figure 15. Harvest records (excluding caribou) from Game Management subunit 26B. (Although about two-thirds of GMU 26B fall outside the Refuge, most sheep habitat in GMU 26B is within Arctic Refuge.)

From 1996 through 2005, general hunting of moose in GMU 26B was not allowed. In recent years, ADF&G has occasionally opened a general moose season in GMU 26B, excluding the Canning River drainage, from April 1-14.

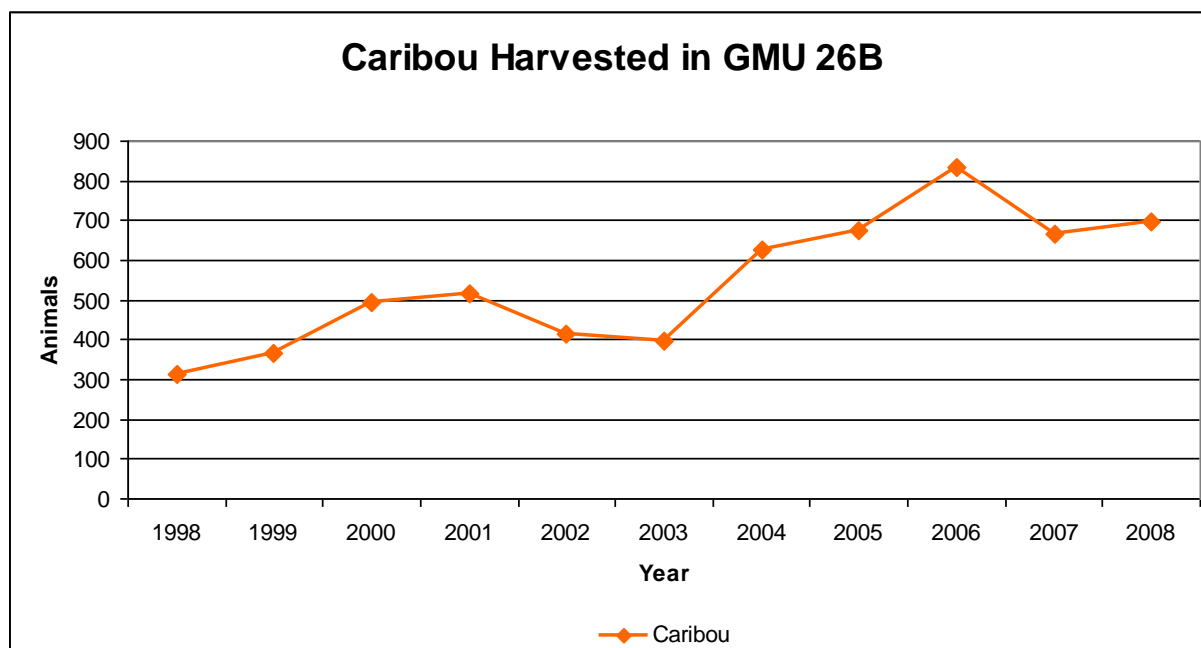


Figure 16. Caribou harvest records from Game Management subunit 26B.

The increase in caribou harvests in GMU 26B (Figure 16) is attributed to increased hunting pressure along the Dalton Highway (Figure 10), which was opened to the public in 1995.

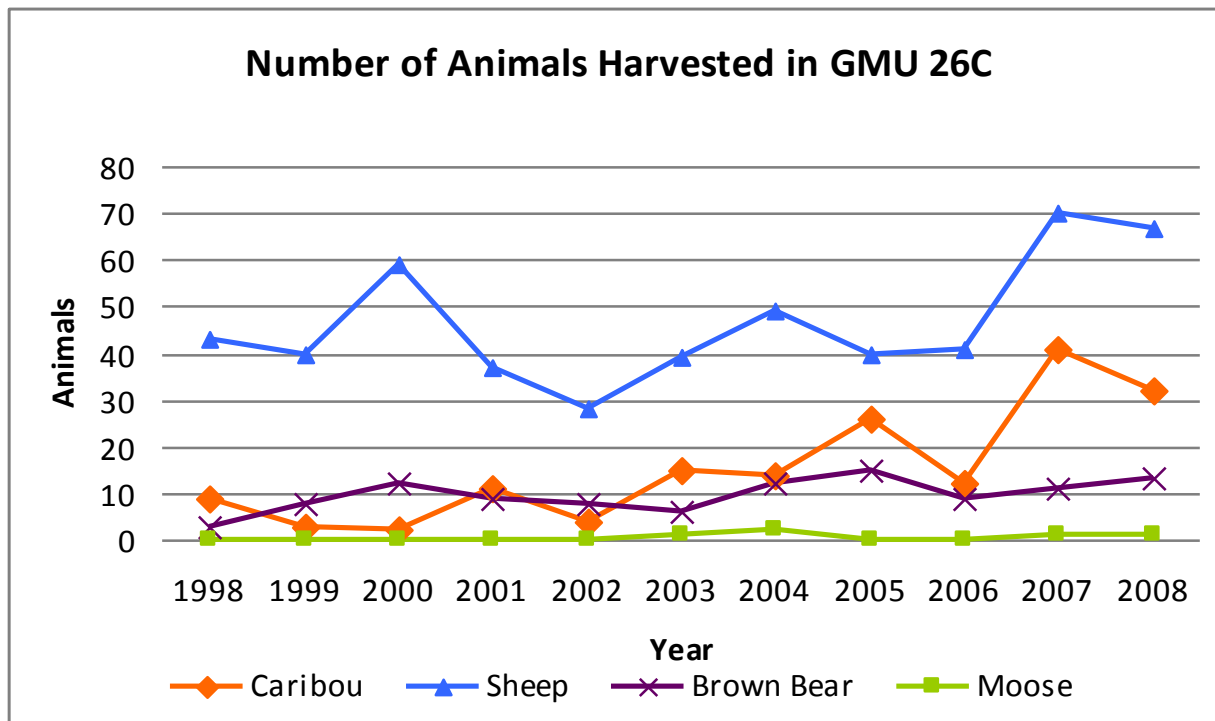


Figure 17. Harvest records from Game Management subunit 26C. (26C lies completely within Arctic Refuge.)

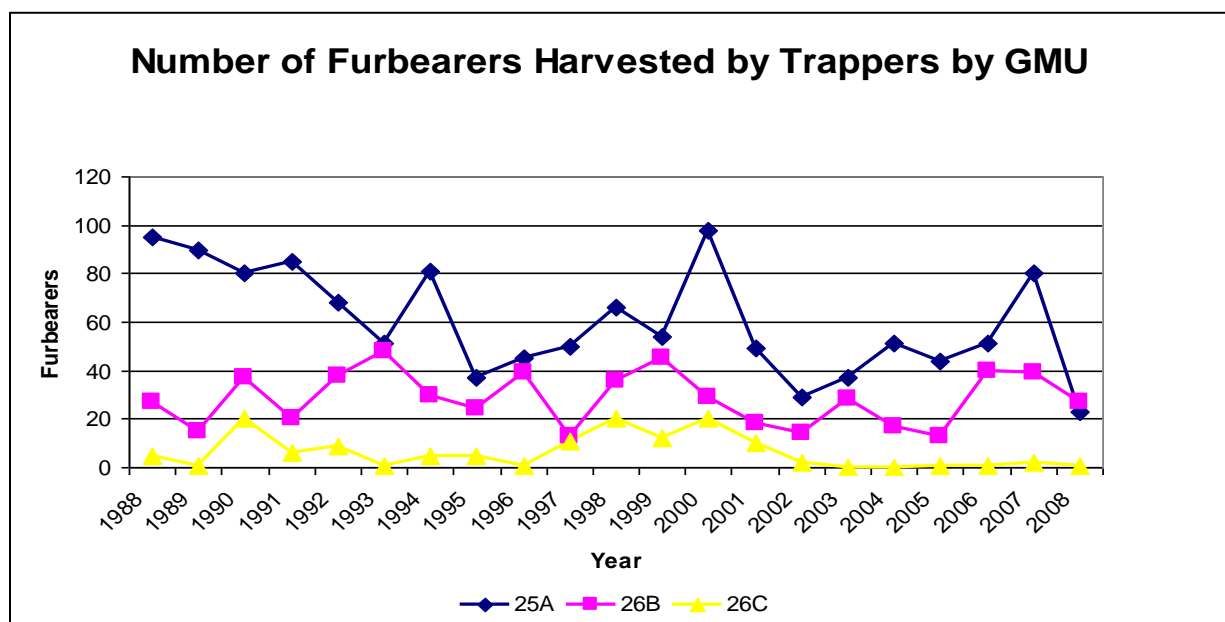


Figure 18. Trapping records (number of furbearers harvested) from Game Management subunits encompassing Arctic Refuge.

The trapping records in Figure 18 reflect a substantial trapping effort by a limited number of trappers. In other words, a relatively low number of trappers are responsible for the recorded

harvest. Actual (non-reported and reported) trapping harvest is believed to be higher than the data reflects. Because there are no designated trapping fur sealers in the villages, many of the trapped animals are never sealed or reported to ADF&G.

#### General Hunting-specific Information

Most general hunters use an air taxi or a transporter to access the Refuge, yet an unknown number of general hunters use their personal airplanes. In 2009 there were 14 commercial air operations permittees, seven of whom offered transporter services to hunters.

Commercial air operations permits encompass two types of air transportation services offered on Arctic Refuge, air taxis and transporters, and a single business may hold permits for both. Air taxi services provide point-to-point air transportation for all types of public users, with fees based on time and distance flown. Users determine the drop-off and pick-up locations. Transporter services provide services only to general hunters. A fixed rate is paid by each hunter for all transportation services including that of gear and game meat, no matter how many flights are required. The transporter is usually responsible for determining the hunting location, but is not allowed to accompany hunters in the field.

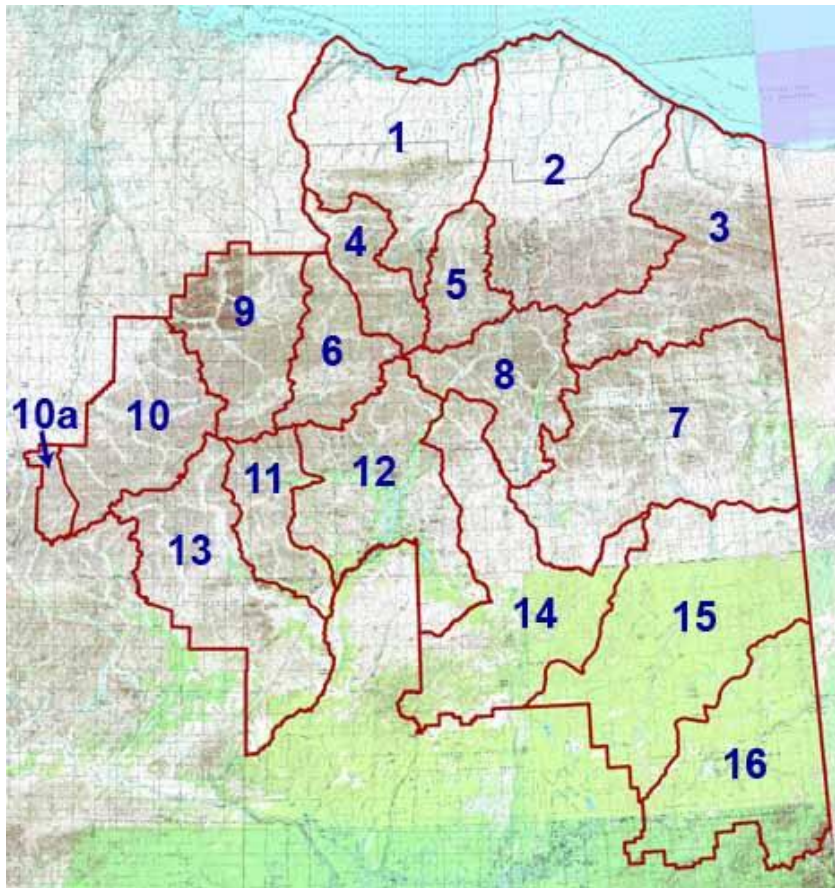


Figure 19. Exclusive commercial hunting guide use areas within Arctic Refuge.

The other commercially-supported method of hunting on Arctic Refuge is guided hunting. Nonresidents of Alaska must hire a guide to hunt sheep, brown bear, and mountain goats (goats don't occur on Arctic Refuge), and nonresident aliens must hire a guide to hunt any big game species. There are 16 geographically separate exclusive hunt guide use areas designated within the Refuge (Figure 19). They are awarded through a competitive process and are valid for five years with an option to renew for another five years, provided that the conditions of the permit have been acceptably fulfilled. Because Federal guide use areas are exclusive and State guide use areas are not, Federal areas are extremely desirable. Several of Arctic Refuge's hunting guide permittees have permits for two guide use areas, resulting in a total of 11 hunting guide service providers on the Refuge. One of the guide use areas (area 12) remains vacant because it surrounds Arctic Village and includes the Arctic Village Sheep Management Area, which is reserved for federally qualified subsistence users from the villages of Arctic Village, Venetie, Kaktovik and Chalkyitsik.

On average, between 2001 and 2009, general hunters (both guided and un-guided) made up about 28% of the total number of commercially-supported visitors to the Refuge. Of these general hunters, guided hunters made up about 25% of the total number of commercially-supported general hunters, while unguided hunters using commercial air operators made up about 75%. A guided sheep or grizzly bear hunt on Arctic Refuge currently ranges from \$12,500-\$15,500, with additional fees for harvesting more than one species. Guided hunters made up only 25% of commercially-supported general hunters partly because guides are limited to a certain number of clients, which varies by guide use area. Each exclusive guide use area has a different amount and quality of sheep, grizzly bear, caribou or moose hunting habitat and a different number of feasible access and egress points. When deciding how many guided hunting clients to allow in each exclusive guide use area, management considers the number of clients proposed during the competitive application process and the number of clients the area can support.

Each guided hunt client harvests on average one animal (Dall sheep, caribou, grizzly bear, or moose). Between 2007 and 2009, there was an average of 85 guided hunt clients who harvested 97 animals annually. Most guided hunts are offered as combination hunts where the client contracts to hunt multiple species simultaneously. During August and September, no one is allowed to harvest more than one Dall sheep, one grizzly bear, and one moose, but they can harvest more than one caribou. Occasionally, a client will harvest two animals (usually different species), and rarely a client will harvest three animals.

Some of the air operations permittees only operate on Arctic Refuge during the hunting season, increasing the potential for concentration of hunting and recreational visitors during this time. At many of the longer airstrips in sheep hunting country, hunting clients of guides, air taxis, and transporters, as well as non-commercially supported hunters, end up concentrating and then competing for hunting grounds. This problem is compounded by the fact that air operations permits are non-competitive and are not restricted geographically, while hunt guide permits are competitive and are restricted to specific areas. There are growing tensions between hunting guides and transporters, particularly in the northwest portions of the Refuge.

## **IV. Current Public Use Trends with Implications for Future Management Practices**

### Overview of National Trends in Outdoor Recreation

The first nationwide outdoor recreation survey was conducted in the United States in 1960. Since that survey, the population of the United States has expanded from 180 million to more than 280 million people in the year 2000 (Cordell et al. 2004). Moreover, experts in 2000 projected a doubling of the population of the United States by the year 2100. Tracking trends in population growth is important because, according to these authors, contemporary population growth is a dominant driver of participation trends in outdoor recreation in the United States. Rate of growth for participation in outdoor recreation closely paralleled population growth in this country from 1960 to 1980 (Cordell et al. 2004).

Between the time of the original survey done in 1960 by the Outdoor Recreation Resources Review Commission, and the 2001 National Survey on Recreation and the Environment (NSRE), millions more Americans reported bicycling, horseback riding, camping, hunting, fishing, canoeing/kayaking, sailing, and swimming. Results of the 2001 NSRE showed a 43% increase in participation for land-based, outdoor recreation activities and a 19% increase in participation for water-based activities by people ages 16 and older during the period 1994 to 2001 (Cordell et al. 2004).

There are other factors besides population growth that affect changes in outdoor recreation trends in the United States, such as the amount of leisure time available to individuals and families. In 1965, the adult population of the United States spent on average 0.93 hours per person per week on outdoor recreation and sports. Rates steadily increased during the next 30 years, to 1.48 hours per person per week in 1975, 2.23 hours by 1985, and peaked at 2.68 hours in 1993 (Siikamäki 2009). After 1993, the average use of time for outdoor recreation activities by the American public slightly decreased to 1.86 hours per citizen per week in 2003 and 2.00 hours in 2007; the declining trend has not continued since 2003, and the average amount of time spent on outdoor recreation in the United States remains at a historic high (Siikamäki 2009).

Another recent study showed that overall participation in outdoor recreation activities increased from 134 million Americans age six and older in 2006 to 138 million participants in 2007 (Outdoor Foundation 2008). Findings from this survey include:

- Americans made an estimated 11.4 billion outdoor excursions either for a day or an overnight trip in 2007.
- Of the 35 activities examined in 2007, Americans most frequently participated in running/jogging/trail running, bicycling, skateboarding, fishing (1.09 billion outings), and wildlife viewing (638 million outings).
- Participation rates in 2007 for outdoor activities ranged from a low of 26%, among Americans ages 65 and older, to a high of 68% for those ages 6 to 12.



- Participation among the nation's youth ages 6 to 17 decreased more than 11% in 2007.
- Youth reported having fun as the most common motivation for doing outdoor activities, followed by discovery, exploration, new experiences, and exercise.
- Participation in outdoor recreation among Americans ages 18 to 64 increased in 2007.
- From 2006 to 2007, overall participation increased for day hiking, bird watching, wildlife viewing, recreational kayaking, and rafting.
- From 2006 to 2007, overall participation decreased for fishing, hunting, and overnight backpacking.

The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted by the U. S. Fish and Wildlife Service and U. S. Census Bureau found that 87.5 million residents of the United States ages 16 and older participated in fishing, hunting, and/or wildlife observation, spending over 120 billion dollars on these activities (USFWS 2007).

Six percent more Americans ages 16 and older (5.2 million more residents) participated in wildlife recreation in 2006 than in 2001. However, declines in participation were reported for some activities. During the period 2001 to 2006, the participation rate for fishing decreased significantly (12%), and the participation rate for hunting decreased by 4%, which is not statistically significant. The amount of money that these citizens spent on fishing and hunting did not significantly change for this period. The USFWS (2007) attributed the overall increase in participation from 2001 to 2006 to a rise in wildlife observation, feeding, and photography, which increased by 8%.

### Overview of Statewide Trends in Visitation and Outdoor Recreation

Outdoor recreation and tourism are important to the State of Alaska and its residents who work in these industries. The Department of Commerce, Community and Economic Development for the State of Alaska sponsors an annual visitor survey called the Alaska Visitor Statistics Program (AVSP) to track trends in nonresident visitation to the state.

McDowell Group is the research firm that conducts the AVSP; it recently estimated that 242,500 out-of-state visitors came to Alaska between October 2008 and April 2009, 95% of these travelled by air and the remainder by highway or ferry (McDowell Group 2009). The majority of these visits were for the purpose of visiting family and friends or business. This number represents a 2.0% decrease in visitors to Alaska from the previous fall/winter season.

Between May and September 2008, over 1.7 million out-of-state visitors came to Alaska, 49% via cruise ship, 46% via air travel, 4% travelled by highway, and 1% by ferry (McDowell Group 2008). Over 1.4 million of these visitors reported the purpose of their trip was for vacation and/or pleasure. McDowell Group (2008) estimated that summer visitation to Alaska decreased by 0.4%

between 2007 and 2008, primarily due to a 1.3% drop in visitors travelling by air. This slight decrease was attributed to high fuel prices and the recent economic recession.

During summer 2006, Alaska received over 1.6 million out-of-state visitors, 34% had been to the state before (McDowell Group 2007). They spent a total of 1.5 billion dollars on their Alaska trip, not including travel to and from the state. They spent an average of nine nights in Alaska; 32% stayed overnight in the interior (24% of the total sample reported Fairbanks as a destination), and 2% stayed overnight in the far north region of Alaska. During summer 2006, 56% of the visitors who were interviewed reported that they participated in wildlife viewing, 30% participated in hiking and nature walks, 20% went fishing, and 71% reported shopping.

Alaska receives a substantial volume of out-of-state visitation, especially during the summer months. However, the residents of Alaska deserve equal consideration when examining trends in outdoor recreation participation and visits to public lands. Residents of the state value the availability and quality of outdoor recreation opportunities. Results of the most recent Statewide Comprehensive Outdoor Recreation Plan (SCORP) show that 96% of survey respondents reported that parks and outdoor recreation were important or very important to their lifestyle, a trend that has remained high since the 1992 SCORP survey (Alaska Department of Natural Resources 2009).

The 2009 SCORP survey showed that overall participation on the part of Alaska residents was highest for hiking, fishing, wildlife viewing or bird watching, walking their dogs, backpacking, and berry picking. Favorite recreation activities for Alaska's youth included basketball, riding all-terrain vehicles or four-wheeling, hunting, volleyball, and snow machining. Ownership of recreational equipment such as tents, backpacks, canoes or rafts, and hunting and fishing gear increased in 2009 for all categories of equipment except for sea kayaks and snow skis. The ownership of off road or all-terrain vehicles increased 28.5% from the 2004 SCORP survey (Alaska Department of Natural Resources 2009).

Fix (2009) reported recent trends and patterns of in-state travel and participation in outdoor recreation from a survey called the Alaska Residents Statistics Program (ARSP), administered October 2006 through March 2007. This survey examined where residents traveled within Alaska and what recreation activities they did there. Residents from the Interior Region of the state reported the highest rates of travel to the Northern Region and the southern part of the Dalton Highway Corridor. The Arctic National Wildlife Refuge and the entire Dalton Highway Corridor were visited by residents primarily during the summer months.

The ARSP indicated high participation rates for food gathering, hunting and fishing, and snow machining in the Northern and Southwest regions of the state (Fix 2009). The Northern region of the state had a high participation rate in all-terrain/motorbike riding. Residents statewide participate in hiking, camping, wildlife viewing, and fishing at high levels. Forty percent or more of residents responding to the 2009 ARSP survey reported that they participate in outdoor recreation in Alaska for one of the following reasons: to gain a better appreciation of nature, spend time with family and friends, obtain meat/food, or for exercise and physical fitness.

The results for Alaska from the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation showed 293,000 anglers, 71, 000 hunters, and 496, 000 participants in wildlife observation. For the period 2001 to 2006, there was a significant decline in the number of anglers in the state, resident hunters, and resident participants in wildlife observation (USFWS 2008).

### 2009 Arctic Refuge Visitor Study Summary

The Arctic National Wildlife Refuge, The Aldo Leopold Wilderness Research Institute, and Christensen Research Company conducted a pilot study of recreational visitors to the Arctic Refuge during the 2008 summer and fall seasons.

The 2008 visitor study began the first systematic effort to understand the area's recreational values, what makes them unique, and how they should be protected and made available to the public. This study is the first part of a long term effort to understand and monitor social conditions at Arctic Refuge. A brief description of the study's objectives, methods and limitations, as well as the entire research report from this preliminary study is available on the web at <http://arctic.fws.gov/>.

#### Highlights from the 2008 Study Executive Summary:

- A total of 313 visitors completed the detailed questionnaire. Of these, 49 % participated in river floating, 40% in backpacking, 21% in hunting, and 8% hiked in from the Dalton Highway.
- Most visitors flew to the Refuge by charter plane (82%), with the most common entry places being in the Kongakut (27%), the Canning (18%), and the Hulahula (13%) drainages.
- The average group size was six. Groups spent an average of 11 days in the Refuge and camped at an average of six different locations during their trips.
- Respondents averaged 49 years old, and 80% intended to return to the Refuge within the next five years.
- The greatest positive influence on visits came from experiencing the components of 'Wilderness' (92%), 'A Sense of Vastness' (92%), 'Remoteness and Isolation' (89%), 'A Sense of Adventure' (84%), and 'Natural Conditions' (84%).
- The Refuge purposes most frequently rated as "Very Important" were 'Wildlife' (97%), 'Wilderness' (96%), 'A bequest to future generations' (89%), 'Remoteness and isolation' (89%), and 'A place where natural processes continue' (86%).

- Respondents encountered an average of two other groups on their trip, saw or heard four airplanes, and saw an average of one site with evidence of previous visitor use.
- Small airplanes were viewed as appropriate for access but not for sightseeing or wildlife viewing.
- Most respondents supported group size limits (82%), with the average preferred for float trips and base camping being nine people.

### Notable Emerging Trends or Patterns in Refuge Visitor Use

#### *Physical Impacts and Perceived Crowding*

Simultaneous visits by both hunting and recreation groups in some high-use areas due to weather, or high demand, have lead to a reported erosion of visitor experiences, user conflicts, and increases in physical impacts such as human waste accumulations. The conflicts appear to be within user type.

#### *Hunter Conflicts*

In recent years, the number of transporters applying for air operations permits has increased, especially by those servicing the northwest portions of the Refuge. Because hunting guide permits are competitive, and transporter permits are non-competitive, conflicts between user groups are starting to arise. At many of the longer air strips in sheep hunting country, hunting clients of guides, air taxis and transporters, and non-commercially supported hunters, end up concentrating and then competing for hunting grounds.

#### *Dalton Highway-based Visitation and Potential Resource Impacts*

The Dalton Highway corridor allows relatively easy and inexpensive access to western portions of the Refuge, particularly to Atigun Gorge which contains high scenic and wildlife values. The Refuge identified an increasing trend in use of the Atigun Gorge area in 2004, when staff began working with the Arctic Interagency Visitor Center and the Toolik Research Station to identify known use of the Refuge originating from the Dalton Highway. Subsequently, the poster entitled, “Day Hiking in Atigun Gorge: Practice Restraint in this Wild Landscape” was developed to bring awareness of the potential for impacts on the fragile tundra in the area.

Since then, the Dalton Highway has been identified as a Scenic By-way, and the State of Alaska is actively promoting tourism in Northern Alaska and expanding the road infrastructure. There is high probability that the western boundary of the Refuge will continue to become more popular with visitors as awareness of relatively economical Dalton Highway-based access continues to rise. The number of commercial permittees offering guided recreational opportunities within Atigun Gorge has increased in the past five years from only one to at least five businesses promoting day-hiking and overnight trips in the area. Current recreation ecology research shows

successful Leave No Trace (LNT) education programs teaching dispersed, low impact “tundra walking” practices is the most effective way to avoid additional impacts and the need for formal trail construction within areas such as Atigun Gorge. Recreation ecology studies and tourism statistics inform the following expectations of scientists currently studying the Atigun Gorge:

- 1) Substantial, repetitive hiking on tundra will quickly exceed its ability to heal, resulting in the emergence of informal trails—particularly at Arctic Refuge’s westernmost boundary, where the spectacular and easily-accessed Atigun Gorge draws visitors to explore this important wildlife travel corridor.
- 2) Continued improvements to the Dalton Highway will increase visitation, particularly when rental car companies allow their cars to be used on this increasingly-paved and straightened road.
- 3) Higher visitation will substantially increase the proliferation of informal trail networks on the tundra unless a visitor dispersal strategy is effectively implemented to:
  - a) Convey educational messages teaching hikers and backpackers dispersed, low impact “tundra-walking” practices; and
  - b) Encourage hikers to adopt and apply these practices.Existing low impact education efficacy research suggests that this is indeed possible.
- 4) Land managers tasked with preserving pristine wilderness conditions have choices about what methods they can employ; implementing an effective LNT education program can increase the likelihood of success in meeting this management goal. If an education program is not implemented, land managers will need to implement a visitor containment strategy and design/construct formal trails at locations where informal networks emerge to access popular attraction features. If neither of these actions is undertaken (and the status quo is maintained), the *worst possible consequences will ensue*: development of a duplicative network of interconnected informal trails from the road to attraction features, resulting in maximum damage to once-pristine areas that will be hard to remove use from and repair. The extent of tundra impact from the “status quo” option is likely to be many times the impact associated with a formal trail, which in turn is considerably more impact than under a successful dispersal strategy. These informal trailing network impacts could happen on tundra in as little as 2-3 years, given current use trends.
- 5) Social science studies show that visitors to protected areas prefer education programs over formal trail construction in pristine settings; are highly supportive of educational programs and/or use limits when protecting pristine settings; and are less supportive of constructing and hardening formal trails. The “costs” paid by wilderness visitors of being exposed to educational messaging is minimal and worth the benefits when compared to the consequences of not applying an educational approach.

### *Polar Bear Viewing*

There has been a marked increase in polar bear viewing activity on both non-FWS and FWS lands within the Arctic Refuge boundary in the past four years. Occasional visitors came to local lodging establishments for the purpose of bear viewing prior to 2001-2002. There may have been an initial increase in bear-viewing visitation triggered by the larger numbers of bears observed aggregating near Kaktovik beginning around 2003, which then spurred commercial enterprise centering around polar bear viewing (Kaktovik is the Native village where whaling occurs and whale carcasses attract both polar and brown bears). Local airlines began accommodating charter requests in 2006, then promoting bear viewing tours in 2008. In May, 2008, the polar bear was listed as Threatened under the Endangered Species Act. Media reports of this action and the plight of the polar bear, combined with other media reports of global climate change, sea ice disappearance, and a simultaneously increasing infrastructure capacity to house visitors in Kaktovik, have aided ever-increasing levels of polar bear viewing activity adjacent to the Refuge (recent increases in activity may actually represent a second spike due in part to the listing).

During this time, in concert with the Alaska Marine Mammals Management office of the USFWS, Arctic Refuge staff intensified efforts to promote education and outreach about polar bear safety and conservation, as well as cooperative management with the community of Kaktovik, with the end goal of minimizing potential disturbance to polar bears.

Beginning in 2009, Refuge staff and permittees operating within 25 miles of the Beaufort Sea Coast were required to adhere to Polar Bear Interaction Guidelines to minimize the likelihood of disturbance to polar bears as defined by the Marine Mammal Protection Act. In 2010, the Refuge implemented a permit requirement for commercial polar bear viewing on Refuge lands and waters surrounding Kaktovik. After an intensive outreach campaign and broad partnership effort which resulted in a Polar Bear Guide Training Workshop, the Refuge received eight permit applications for the activity of Commercial Guided Polar Bear Viewing in 2010.

The opportunity to view polar bears outside of captivity offers a valuable tool for delivering species and land conservation messages, if practiced in a way that promotes a conservation ethic. The Arctic Refuge is responsible for insuring that commercial uses of its lands and waters, including the emerging opportunity to view polar bears with a commercial guide, are conducted in a way that complies with both the Marine Mammal Protection Act and the Endangered Species Act. Refuge staff continue to work in concert with the Marine Mammals Management office polar bear biologists, the Fairbanks Fish and Wildlife Field office endangered species biologists, and a wide array of Kaktovik community partners to manage its commercial guided polar bear viewing program for optimal support of polar bear conservation.

### *Packrafting*

The emergence of commercially-manufactured packrafts (lightweight, backpack-able inflatable rafts) is making rivers and streams that were once un-floatable due to low water or lack of access more available to a range of users. This could potentially change the patterns of use on Arctic Refuge. Visitors may seek exploratory, pioneering routes into country that has received little

visitation. Also, visitors may spend more time on the Refuge pursuing combination backpacking and river floating adventures. By providing more opportunities for floating, the use of packrafts may disperse visitation across a broader swath of the Refuge—but it has its own unique set of inherent risks.

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## Appendix I

### Public Use Glossary

**This document contains useful terms describing the variety of on-Refuge users and activities**

**Refuge staff**—Arctic Refuge employees, as well as any other agents of the federal government, who are conducting work for the Refuge to achieve the Refuge mission. Such activities do not require a special use permit and may be contracted or performed by agency partners.

**Administrative activities**—Any activities conducted for the Refuge by Refuge staff.

**Compatible use**—A proposed or existing wildlife-dependent recreational use or any other use of a Refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the mission of the National Wildlife Refuge System or the purposes of the Refuge (USFWS Service Manual, 603 FW 2 2.6).

**Public use**—A blanket term that includes uses by visitors (including recreational and general hunting and fishing visitors), and by local rural residents. Throughout this list, the term “user” includes visitors as well as local and/or federally-qualified rural residents engaged in subsistence activities; while the term “visitor” is limited to recreational and general hunting and fishing users.

**Visitor use**—Any use of the Refuge by recreational, general hunting, and general fishing visitors (does not include federally-qualified subsistence users or local users—see below).

**Visitor use day**—This is a tally of each day a visitor spends on the Refuge. For example, one person who spends five days on the Refuge would be counted as one visitor *and* five visitor use days. Visitor use days more accurately express the total use of the Refuge than do the number of visitors.

**Recreational visitor**—A visitor of the Refuge who engages in recreational activities other than general hunting and fishing is considered a recreational visitor. (may include non-federally-qualified local or non-local individuals engaged in traditional activities, such as berry picking). For consistency, the term “recreational visitor” is preferable to “recreationist.”

**General hunting visitor**—Often referred to as “sport hunters,” general hunters are Refuge visitors engaged in hunting under the State of Alaska hunting regulations. The term “general hunter” is preferable to “sport hunter” due to differing federal and state definitions of the term “subsistence” (see subsistence user).

**General fishing visitor**—Often referred to as “sport fishers,” general fishers are Refuge visitors engaged in fishing under the State of Alaska fishing regulations. The term “general fisher” is

preferable to “sport fisher” due to differing federal and state definitions of the term “subsistence” (see subsistence user).

**Subsistence user**—A Refuge user engaged in subsistence activities who is a federally-qualified rural resident.

**Federally qualified subsistence user**—A rural Alaska resident qualified to harvest wildlife or fish on federal public lands or waters in accordance with the annual Federal Subsistence management regulations for harvest of wildlife or fish.

**Rural resident**—Rural means any community or area of Alaska determined by the Federal Subsistence Board to qualify as such. Only residents of communities or areas that the Board has determined to be rural are eligible for the subsistence priority. Resident means any person who has their primary permanent home for the previous 12 months within Alaska, and whenever absent from this primary permanent home, has the intention of returning to it.

**Customary and traditional use**—The Federal Subsistence Board decides which communities or areas have customarily and traditionally used a species. Each game management unit lists these customary and traditional use determinations along with season and bag limits. When there is a positive determination for a specific community or area, only residents of that community or area have a Federal Subsistence priority for that species in that unit and are eligible to hunt or trap under the federal regulations.

**Local user**—A local user is a rural resident who relies upon the Refuge for a range of subsistence activities, but may not be a federally-qualified subsistence user, based on customary and traditional patterns of use in the area.

**Refuge permit**—A special use permit, issued by the Refuge Manager, authorizes on-Refuge activities conducted by non-Refuge staff. Permits are required for scientific research, commercial activities (such as recreational guiding, big game hunt guiding, and commercial videography), and other miscellaneous activities conducted by organized groups. Permitted uses have been deemed compatible with Refuge purposes, are found not to have a significant impact on subsistence activities, and are regulated in such a way that permit-holders have specialized responsibilities to the Refuge.

**Non-competitively-awarded Refuge permit**--The majority of Refuge permits are non-competitively awarded, which means anyone who fulfills the application requirements will receive a permit for their proposed activities.

**Competitively-awarded Refuge permit**—Currently, the only competitively-awarded permits on the Refuge are for hunting guides. The competitive process requires applicants to submit a detailed application, which includes a description of personal qualifications and an operations plan. The Refuge Manager reviews all applications and selects the most qualified applicant. The number of permits awarded is limited to the number of exclusive guide use areas available.

**Permittee**—An individual whose activities are authorized by a special use permit. The categories, descriptions and general restrictions are listed below:

*Scientific Research* permittees' activities and their work crew group size totals are evaluated on an individual basis to minimize overall impact to the Refuge.

*Miscellaneous Activities* permittees are issued to individuals engaged in activities that are conducted by organized entities, such as service organizations, but are not profit-oriented.

*Commercial Recreation* permittees and their employees (guides) are subject to standardized group size limits and other special conditions. Note: their visitation numbers have historically been included within reported recreational visitation numbers.

*Commercial Big Game Hunting* permittees are subject to the permit conditions detailed in their competitive application. Each hunting guide is limited to a specific geographic area within the Refuge and restricted to a specified number of hunting clients.

*Commercial Air Operations* permittees provide two types of air transportation services offered on Arctic Refuge.

*Air taxi services* can be utilized by all types of public users, including general hunters. This service provides point-to-point transportation with fees based on time and distance travelled. Air taxis may serve hunters, who are charged the same rate as their other clients (river rafters, backpackers, etc.). When a hunter hires the service of an air taxi, the hunter decides the drop-off and pick-up location.

Alternately, *transporter services* are utilized by general hunters only. Transporters offer fly-in services to hunters, and they directly target their business to hunters. A fixed rate is paid by each client to the transporter for all transportation services needed, including to move gear and game meat, no matter how many flights are required, or the time and distance travelled. The transporter is usually responsible for determining the hunting location, yet the transporter is not allowed to accompany clients in the field.

Depending on the season and the permits possessed, air taxis and air transporters may interchange their services; air taxis may offer transporter services and transporters may offer air taxi services.

**Hunting guide use areas**—There are sixteen geographically separate exclusive hunting guide use areas on Arctic Refuge, for which permits are awarded through a competitive process. Each hunting guide has a maximum number of clients they are allowed to guide in the area. In Alaska, non-residents are required to be accompanied by a guide when hunting Dall sheep, grizzly or brown bear, and mountain goat (goats do not occur on Arctic Refuge).

**Commercially-supported**—Activities or users that are either guided, taxied, or transported by a commercial permittee of the Refuge onto Refuge lands or waters.

**Non-commercial user**—A user is considered non-commercial if s/he is a local rural resident or a visitor not relying on commercial guides, air operations, or any other commercial services during their stay on the Refuge. Non-commercial activities are participatory in nature: trip preparation, cost, and conduct are shared by all members of the group (this includes logistics, food purchase, equipment assembly, transportation, and sanitation). In non-commercial activities, there is no compensation paid to an individual, group, or organization for the service of conducting, leading, or guiding. Non-commercial activities are not to be used by any person or organization in any way to obtain a profit, and in no way should they participate in advertizing for a profit.

**Commercial guide**—A commercial guide is an individual whose intent is to financially profit, or be otherwise compensated, in exchange for the service of guiding clients on the Refuge for recreational, hunting, or fishing activities. Commercial guides are required to be permitted or be employed by a permitted business owner prior to conducting activities on the Refuge. The term “guide” does not generally apply to air-taxi operators, who only provide point-to-point transportation services.

**Base camp**—A base camp serves as a center of operations and overnight accommodations for people working in a remote part of the refuge (e.g., refuge staff, guides, and clients). A temporary base camp is generally removed within 48 hours, though some operations have camps that can remain for extended periods. Base camps have the potential to cause lasting physical impacts, since they often consist of larger tents than do transient camps and in limited cases may use tent platforms or other rigid floors. The primary distinction between temporary base camps and transient camps is the period of occupancy. The specific details of a base camp used by Permitted operations on Refuge lands would be spelled out in the Refuge Special Use Permit.

**Packraft**—A lightweight, backpack-able, inflatable raft, making more available many rivers and streams that were once un-floatable due to low water or lack of access. The use of pack rafts has the potential to disperse visitation across a broader swath of the Refuge, and has its own unique set of inherent risks.